CONTEMPORARY ISSUES

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MARCH-APRIL 1955

A letter by Albert Schweitzer
to a Scientist

Ideologies and Annihilation — Jules Laurents

The Bomb and the Weather — Karl Berninger

Reactions to "Stop the Bomb"

The Responsibility of Free Men — H. D. Kirk

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A LETTER BY ALBERT SCHWEITZER TO A SCIENTIST

[*The following letter by Albert Schweitzer has been published in the London* Daily Herald, *the* Saturday Review *and* Science. *Underlining the fact that the development of science has created conditions which place not only great responsibility upon all scientists in the atomic field but also the power to act effectively against the danger they themselves have evoked, the importance of Albert Schweitzer's letter, which goes to the crux of the matter, can hardly be overrated. Endeavoring ourselves to give the public all available scientific and social data concerning atomic explosions and experiments, we republish Schweitzer's letter in the hope that his appeal to responsibility and reason will not be in vain. — Editors.*]

THE SCIENTISTS MUST SPEAK UP

THE problem of the effects of H-bomb explosions is terribly disturbing, but I do not think that a conference of scientists is what is needed to deal with it. There are too many conferences in the world to-day and too many decisions taken by them.

What the world should do is to listen to the warnings of individual scientists who understand this terrible problem. That is what would impress people and give them understanding and make them realize the danger in which we find ourselves.

Just look at the influence Einstein has, because of the anguish he shows in face of the atomic bomb.

It must be the scientists, who comprehend thoroughly all the issues and the dangers involved, who speak to the world, as many as possible of them, all telling humanity the truth in speeches and articles.

If they all raised their voices, each one feeling himself impelled to tell the terrible truth, they would be listened to, for then humanity would understand that the issues were grave.

If you and Alexander Haddow who has pleaded for a United Nations conference of scientists on the H-bomb can manage to persuade them to put before mankind the thoughts by which they themselves are obsessed, then there will be some hope of stopping these horrible explosions and of bringing pressure to bear on the men who govern.

But the scientists must speak up. Only they have the authority to state that we can no longer take on ourselves the responsibility for these experiments; only they can say it.

There you have my opinion. I give it to you with anguish in my heart, anguish which holds me from day to day.

With my best wishes and in the hope that those who must advise us will make themselves heard.

ALBERT SCHWEITZER

Jules Laurents

IDEOLOGIES AND ANNIHILATION*

IN *Experiment in Annihilation* the immediate and long-range damage resulting from thermonuclear explosions have been investigated. The consequences of continuing these explosions, which from the genetic standpoint alone entail nothing less than lowered viability of the entire race, decree that they be stopped. This conclusion forces itself upon us independently of politics or partisanship, and our argument thus far stands complete in itself.

On the other hand, the knowledge thus gained of the bomb may serve as background for wider reflection, and notably for dispelling certain zealously propagated illusions concerning its social implications. By way of introduction we may pose the natural question: why did the bomb come into being at all? It would be a false approach to explain the existence of the H-bomb in terms of the machinations of various politicians, monopolists, mad scientists, etc., although to be sure such machinations are everywhere involved as *instruments* of the development, and furnish most instructive studies in their own right. It is no more valid to explain the advent of genocidal weapons in terms of conscious design than it would be so to explain *genocide,* which has in our century emerged as a general social phenomenon with such diverse practitioners as Germany ("race purification"), Russia and China ("forced collectivization") and America ("strategic bombing" of civilians).

One principal feature of the twentieth century is the development of industrial wealth, technology and science to the point where the abolition of general want becomes for the first time in history in principle immediately feasible. A second principal feature is the extreme disparity with which control over this wealth has become concentrated, both among nations and among individuals within the dominant nations — a disparity inherent in the very competitive mechanism which actuates the accumulation of wealth. From the interplay of these two forces arises a progressively more violent social disequilibrium which must continue until obsolete social relations and forms, which alone block the attainment of the new material possibilities, are dissolved. Because the ruling powers, driven by blind compulsion to dominate, attempt at all costs the impossible task of preserving the *status quo,* mankind is involved in an ever more ruinous struggle. This already has brought two generations of social retrogression to the world, as evidenced by two global wars and the general emergence of totalitarianism. One can get no clearer perception of infinity than to estimate the sum total of slaughter, waste, betrayal and human misery in the twentieth century.

At the pinnacle of the retrogression, and embodying its purest crystalline essence, stands the hydrogen bomb. This is the highest creation, the final

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* This is the sequel to *Experiment in Annihilation,* which appeared in *Contemporary Issues,* No. 20. Italics, unless otherwise stated, are throughout the author's.

"wonder", which the present social order has achieved. The bomb is the symbol of negation of every worth-while possibility, the *deus ex machina* which has come forth to bring the "final solution" to the problems of implacable competitors and "surplus" populations. Worse than even its sponsors had anticipated, it has not even a "rational" military purpose: direct use of the hydrogen bomb against man will signal the twilight of our civilization. The bomb appears only as a weapon against history itself.

For in the end the dictator and monopolist of to-day can no more preserve the grotesque *status quo* than could king and feudal lord resist the great tidal wave of the industrial revolution. Yet they wield a physical power unknown to any previous minority in history. With the monster explosions at Bikini they have, purposefully or no, served notice upon humanity that if they cannot stay the clock of history, then at least they might shatter it! At the end of retrogression their failure may signal itself to the distant planets and the fruit of two billion years of terrestrial development be annulled.

1. The New "Heroic" Cult and "Massive Retaliation"

Objective conditions generate ideologies of rationalization in minds which would "justify" those conditions. The need subjectively to "justify" when in fact analysis and social action are called for is found in those who, because of vested interests or inherent limitations, are constrained to a framework within which honest analysis and social action are impossible. The greater the inherent inability to deal with a social problem, the more wild and dishonest are the "theories" brought forth. For instance, the quackery of neo-Malthusianism is a reflection in bourgeois consciousness of the objective phenomenon of genocide.

If the hydrogen bomb stands at the pinnacle of retrogression, the attempt, *inherently* impossible, of dealing with it in the arena of power politics and cold war diplomacy — an arena that is the product of the same social forces which have summoned into being the bomb itself — stands at the pinnacle of futility. The awareness of an approaching storm increases, reinforced by stern assurances from the "bombers" themselves that, e.g. "every weapon in the West's arsenal[1] will be used in case of war"[2] (Gen. Gruenther, Supreme Allied Commander in Europe). The rationalization of this deep objective futility is a spectrum of ideologies and delusions extending into the depths of lunacy.

At the extremity, and having historical precedent in the last nihilistic ravings of Hitler, is what we may call the "heroic" ideology, illustrated in a recent letter to the *New York Times*:

> "As one humble citizen of these United States speaking only for himself, I can imagine living [!] in a world reduced to ashes as being infinitely better than

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[1] This statement cannot be taken literally: there are not enough targets in the world for "every weapon in the West's arsenal".

[2] Similarly, a recent NATO study "disclosed" that "The next war will be atomic and all-out at the start", and the powerful Republican Senator Styles Bridges has stated (*AP*, 6th June) that "he favored use of the atomic bomb in Indo-China rather than send American troops there. 'To save American lives I would use the atomic bomb anywhere,' Senator Bridges said, adding that he would have done so in Korea". Admiral Radford and others support the demand of that "great patriot" (*N.Y. Times*) Synghman Rhee for preventive war now.

> living in one reduced to communism. If compelled to make the choice I would, however agonizingly, make it on that basis."

If this "humble" citizen spoke only for himself, we should gladly leave him to the obscurity his ideas so richly deserve — but his statement is echoed by men of great power and influence — in fact by "official" policy. Thus, Admiral Halsey remarked recently that the Communists

> "should have their necks cut off every time they stick their heads above ground . . . I hate to see people in our country appearing to be jitterish right now. *That's not becoming for an American. I can't see any difference between being killed by an atomic or hydrogen bomb and being killed by a hand grenade.*"

In more subdued colors, but of the same cloth, is the *rationale* of Nobel prize physicist Harold Urey, who with an incredible inversion of the concept of individual heroism supported Truman's 1950 decision to build the H-bomb because "with Patrick Henry, I value my liberty more than my life".[3]

The modern nihilist prefers to "*live* in a world reduced to ashes" — which means, stripped of its subjective fancy, to die with the rest of us — so long as he can tear down with him the whole fabric of civilization, die "heroically" as all is consumed in flames in a last frenzy of destruction.

In an earlier period of history it would not be necessary (outside of medical journals) to discuss such "heroism", in reality a nihilistic *ad absurdum* of subjectivism and infatuation. This delusion is fully characteristic of our time,[4] just as much so as is the instrument for the physical realization of its craven prophecy. Because the delusion, especially in more veiled formulations, is a general phenomenon, one cannot content oneself with merely pointing out that it is every man's birthright "agonizingly" to jump out of the window when he is no longer willing nor able to face his social responsibility.

Death is not of itself morbid: In any healthy organism, whether biological or social, the death of the cell or individual is a natural and necessary part of the *life* of the organism as a whole. It is as necessary to every balanced organism or biological system as birth, and it is inherent in the mechanism of the evolution of higher forms. In the human body cells are dying constantly and this is an indispensable part of the process by which the human body lives. So it is with trees in the forest, from whose very death spring forth new forms of life — and so also with the human being in society. When he completes his existence, infinitesimal in every way against the larger background of terrestrial life, he is in no way absolved from full responsibility for the well being (to say nothing of mere *preservation*!) of society — in fact, individual heroism exists only within this framework.

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[3] General Walter Bedell Smith, Under Secretary of State, said in a recent speech (reported in the *N.Y. Times,* 10th September):

> "These nuclear weapons will be called into play only to put down aggression. But everyone should realize that point could be reached where their use might be necessary to preserve [!] the liberty which thousands and thousands of Americans in the past, including Patrick Henry, deemed to be worth more than life." And unmistakable is the content of his later remark: "Different threats demand different ways of dealing with them. Cold wars require cold nerves. Communism will be stopped where the free world is prepared to stand."

[4] As Ernst Zander remarks, the motto "Après moi, le déluge" of the ruling classes of Louis XV time has become in our time "*Avec* moi, le déluge".

There is more to human society than a mere conglomeration of individuals, just as the individual in turn is far more than a conglomeration of cells or of molecules. The ensemble has, at least potentially, and strives historically towards, a harmony both within itself and with nature that makes the whole infinitely greater than the sum of its parts. Viewed from another side: although the death of each individual is a necessary event, the simultaneity of all these events, i.e. the death of the *whole,* the supreme loss, would utterly transcend even the sum total of individual loss. If our society is so diseased that it must die, let it in so doing give birth to a new and healthy one.

"Reducing the world to ashes" and (what differs only in degree) experiments in annihilation which *irreversibly* degrade the physical and biological bases of life, exclude themselves *unconditionally*[5] from sane thinking. Even invasions, annexations, occupations, political tyranny and other malignant features which appear in the historical process are in principle *reversible* by the laws of history — providing of course that the historic framework remains. The existence of lunatic ideologies which would admit the destruction or debilitation of the whole becomes that much more ironic when one recognizes the material feasibility of the positive goal — the desired "harmony" of the whole attainable in our generation, offering in turn a rich new life to the individual.

The "heroic" ideology which negates the basic law of life (and the concept of heroism) is formulated into national policy in the doctrine of "massive retaliation". If the concept of revenge is harmful and stupid between individuals, between nations it is insanity — especially when the victims of "retaliation" are just those hapless folk who have long been suffering under the yoke of their own ("aggressor") rulers.

The foregoing considerations are of a universality which makes unnecessary an appraisal of the concrete political situation. They would only be further reinforced by detailed analysis of the "ideological struggle" between "the free world" and "communism", the "moral crusade" of nascent American totalitarianism "against" the full-blown Russian product, the deep internal contradictions in America's announced policy. Yet if, for the sake of argument, we concede as valid this whole Alice-in-Wonderland fabrication of history, grant the existence of a magical place called "the free world", etc., we need not change a word of what has been said.

Thus, for instance, although the choice of "freedom versus slavery" does not *in fact* pose itself, Lewis Mumford was quite correct in writing: "The worst of all [alternatives to annihilation], submission to Communist totalitarianism, would still be far wiser than the final destruction of civilization".

Impressive is the absurdity which led even the dimly perceptive George Sokolsky to write in the *New York Journal American*:

> "We are being told that our retaliatory powers are enormous. Does that mean that if New York is wiped out, Moscow and Magnitogorsk will also be wiped

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[5] One naïvely expects at least a learned scientist to have fitting respect for the rich and immense variety of life on our planet, a deep appreciation of the painstaking process by which it developed (especially when he has contributed heavily to the understanding of that process!), the millenia of "trial and error" until even the first protein molecule appeared, the millions of years of human evolution, etc. — an appreciation that might transcend commodity relations and the need for the approbation of generals.

> out? Or that if one Hellbomb is hurled at us, eleven Hellbombs will be hurled at cities in the Soviet Universal State? Such retaliation may be a fascinating study for those who are planning it, but what about the 8,000,000 people of New York who would be killed? *And what would become of our civilization under such circumstances?*"

The people of the world are fully aware, and duly terrified, of the lunacy of "massive retaliation". We may cite especially the Japanese, who have never forgotten the American A-bombing of their cities, and for whom the H-bomb is now a leading national issue. In England the Bikini explosion of 1st March produced a crisis in the Churchill government, and the London Bureau chief of *Time-Life* magazines cabled that "a wave of hysteria, that could easily grow to disastrous proportions, is sweeping Britain". A leading British newspaper captured the sentiment of the average citizen in the headline "One H-Bomb Can Wreck All London". David Lawrence, editor of *U.S. News and World Report,* was chagrined[6] to find on his recent trip to Europe that the French people, who survived several years of German occupation, are far less afraid of being occupied by the Russians than they are of American hydrogen bombs. As a last example, in the United Nations, 9th July, American delegate Mason Sears told Indian delegate V. K. Krishna Menon, who had proposed discontinuance of American thermonuclear explosions,

> "that he was 'truly sorry' that India does not seem to understand that the experiments are being carried out as part of the defense of the free world, including India. Mr. Menon responded that 'India can take care of itself'." (*N.Y. Herald Tribune,* 10th July.[7])

In short, people do not care to be "liberated" in the form of steam. We may leave it to Professor Urey to judge whether the individual is free or enslaved, whether "democracy" or "communism" reigns on a dead planet.

It is instructive finally to examine the relation of "massive retaliation" to the concept of war itself. Until very recently a belligerent nation, confronted with an internally dissident enemy, would exploit that dissension. "Massive retaliation", however, levels the sheep with the goats and ensures the greatest possible degree of destruction — acts of internal resistance, sabotage, etc., which could ordinarily be turned to advantage are precluded in advance. From this viewpoint, "massive retaliation" appears as the *ad absurdum* of the Allies' brutal and unprecedented World War II policy of "unconditional surrender" (note that the two also base themselves on the fraud of "collective guilt" of a whole people). Announced in 1943, this policy dealt the *coup de grâce* to a growing internal resistance movement in Germany, and alone provided the basis of unity that sustained the German war effort to the limits of physical endurance. It is the same with Japan, whose surrender was postponed two years — and whose

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[6] Under Secretary of State Smith, in the above-cited speech, declared that the U.S. had "an aim so simple that there are some, even among our friends, who hesitate to give it full faith and credence. It is to prevent war. There is no question in my mind that we have the commanding position in nuclear weapons. But these same weapons that assure us the margin of advantage of a thrusting and implacable enemy have themselves generated doubt and apprehension, not only at home, but also among our allies. This is indeed a strange and puzzling situation [only for the infatuated? — J.L.]. Are free men, in their defense, to be prevented from using the instrumentalities brought forward out of this technical inventiveness because of brooding misgivings and distortions of purpose?"

[7] All dates without years are 1954.

"strategic"- and atom-bombings were thus assured. We cite as a final example the dire consequences of Hitler's massive annihilation of the Ukrainians who had welcomed him as a "liberator".

2. Digression: The Official Perspective Under "Best Possible" Conditions

A recent *New York Times* article headed "FEAR HELD PEACE HOPE — President Calls Atomic Bomb Terror a Vital Factor" stated: "President Eisenhower said to-day that growing understanding of the unbelievable terrors of atomic and hydrogen bombs was the world's 'greatest hope' for peace". Drew Middleton described similar statements of Anthony Eden's in the *New York Times* under the heading "EDEN SEES BENEFIT IN HYDROGEN BOMB. Says 'Terrifying' Weapon May Prove to be a Deterrent to Third World War". These examples are characteristic: the "deterrent" ideology, or "peace through terror", is the official opiate administered throughout the world, the slender base on which whatever peace of mind the great powers would leave to the people of the world must rest. Although we shall deal fully with this spurious ideology, it is most instructive to make a digression first and let the advocates of the "deterrent strategy" tell us in their own words what we may expect of the future *in the best case,* i.e. if the "strategy" really "deters".

"Fifty years of cold war", we are promised, although why fifty and not a hundred or a thousand should be the magical number is not clear. "A succession of small wars, but no global war" — nothing worse than Koreas and Indo-Chinas. General Bradley informs us cheerily (with a correctness of the depth of which he himself is unaware) that in fifty years war will be a thing of the past. "We are living in an age of terror", warns Charles Wilson. Yet "prosperity" and "full employment" are promised, meaning that the rate at which natural wealth and human effort are transformed into useless and destructive products shall proceed at a certain level.

The essence of the projected future is militarism, armament, mobilization spurred by such disclosures as:

> "Senator Stuart Symington said to-day the Soviet Union probably was outstripping the United States in the development of long-range guided missiles with hydrogen warheads against which there was no defense. [He] told the Senate there was an 'excellent chance' Russia would be able to wage an all-out missile attack against the United States within five years [and certainly] in ten years. He said the Soviet Union was proceeding at full-speed with its missile program while the United States was appropriating less and less each year for research and development." (*UP*, 21st July.)

When, asks the bewildered citizen, will we ever have enough bombs and jets and missiles and rockets and radar? *Nucleonics* some months ago quoted a high American official's opinion that "there is no such thing as 'enough' atomic weapons".

Working to accumulate the infinite stockpile desired,

> "[Admiral] Strauss, chairman of the AEC, told a Senate subcommittee Wednesday that the Government planned to spend $427,400,000 more in the fiscal year beginning July 1 to push ahead with 'greatly increased production of thermonuclear weapons' . . . Twelve new plants were moving into production this year and others would be added next year, he said." (*AP*, 7th April.)

But lest one became complacent:

> "Eugene M. Zuckert, recently retired Atomic Energy Commission, to-day . . . said the nation needed more atomic weapons. . . . He said weapon technologies

> changed so rapidly that no one could say now 'what we will need to fight a war five to ten years from now'." (*UP*, 2nd July.)

After all, the atomic weapons industry makes profit even if it does not make sense. The general perspective is frankly drawn for us by Gen. Charles Lindbergh in the *Saturday Evening Post,* 17th July, 1954:

> "Mankind has entered another of the historically recurring periods of catastrophe and crisis, this time on a global scale. . . . These tools [of destruction] have now reached the hands of a Soviet government which is ruthless, dictatorial, and antagonistic. Under such circumstances, *it is inevitable that our primary attention be shifted from the advantages of progress to the essentials of survival* [!].[8] [We] now have an obligation to our beliefs, our ideals [!] and to future generations [!] which demands *unlimited* [!] *sacrifice to essential military strength*. . . . Our military problems would be relatively simple if we had only to measure our forces against those of our potential enemies, and to keep in advance of their accomplishments. But the American policy of non-aggression requires a military position of such magnitude that if our enemies should strike us by surprise, annihilating hundreds of our bases and dozens of our cities, we can still exceed their power.[9] . . . It is a formidable task, *extending into the future as far as we can see,* but it is within our capabilities. Our objective is the survival [!] of western civilization. Our policy must be dynamic. *There is no longer such a thing as adequate defense.* As long as a dangerous enemy exists, our security will lie in the indestructible power to destroy."

Bearing out this bleak perspective, we may recall some remarks of Assistant Defense Secretary Donald Quarles, delivered at the "top-level" conference on "defense" at Quantico, Va., 19th June:

> "We must conclude that . . . our technical position *vis-à-vis* the Soviets is less favorable than it was a year ago. Our margin of advantage has been narrowed and we must face the sober inferences to be drawn from these facts. . . . *We must not expect that we can ever make a final, decisive move that will ensure our superiority. There is no end to the moves and countermoves.*"

As for hydrogen "experiments", they will keep pace with the rest of the development. "MORE BOMB TESTS DUE IN THE PACIFIC", reports the 8th July *New York Times*. "Future tests of this kind will be larger than in the past", reports Robert S. Allen from Washington, 19th April. Watson Davis, director of *Science Service,* expresses the zeal of the scientist of the future for new "experiments":

> "Many more H-bomb explosions will occur in the Pacific in coming months. Aside from any military or political reasons, we must know about the phenomena of fusion, the transmutation of light elements, [etc.] . . . [The March 1 test] should have been made for scientific reasons, simply to know about the facts of matter and energy, even if it served no military or political purpose. . . . There are so many possible combinations of the light elements to try that we can expect many more H-bomb tests." (*Science News Letter,* 17th April.)

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[8] One must grasp the full content of this statement, which is already concretized in our daily life. Parallel with the militarization and barbarism comes the negation of everything human, useful and worth-while. While billions are spent for H-bombs, etc., ridiculous "economy" measures have been directed against the Library of Congress, Pure Food and Drug Administration, national parks, etc. Just one example: it is especially shameful to read that "for lack of funds" the national parks, our beautiful public lands, are falling into serious deterioration, as described in a recent series of feature articles in the *New York Times*. Recently Secretary of the Interior McKay told the President: "I would like to have $50,000,000 for the parks, but we just don't have it." Small wonder: Around the same time the Senate granted Lewis Strauss, immediately on request, nearly a half *billion* dollars "to push ahead with greatly increased production of thermonuclear weapons". Probably the cost of one Bikini "experiment" would settle the entire national park problem!

[9] This sentence is the *rationale* for infinite stockpiles of atomic weapons.

Mobilization proceeds apace throughout all aspects of public life: greater conscription, the expanding nuisance of "civil defense",[10] etc. "Atom Bombing of 'Ghost' Town Urged to Teach Nation Lesson of Power", says a recent headline. "A move to promote a 'war atmosphere' in all parts of the state government was begun yesterday by the State Civil Defense Commission", reports the *New York Times* of 22nd July. A subterranean "Pentagon" building has already been constructed, to take over command after Washington has been levelled. Big businesses throughout the country now make microfilm copies of their records and store them in air-conditioned remote subterranean vaults so that business may go on as usual after all is flattened. Youth lives in the shadow of conscription while the armed forces engage in "limited operations" and are made "realistic" with increasingly macabre training. "Nerve gases and biological agents, as well as missiles and atomic weapons, are in simulated use in Exercise Flash Burn, the largest Army maneuver since World War II", reports Hanson W. Baldwin from Fort Bragg, N.J., in the *New York Times* of 1st May. Each soldier, he explains, carries an atropine styrette "and the soldier subjected to nerve gas attack is supposed to plunge the needle into a muscle and give himself a dose of atropine, a heart stimulant which relaxes the paralyzed nerves and permits normal breathing". The more farsighted civil defense theoreticians see the civilian of the future as carrying a special kit with atropine-filled hypodermic and other equipment to protect against "sneak attack". New times, new projects:

> "Twelve young men, opposed to war on religious grounds, will start a diet this fall on food exposed to atomic radiation.[11] The Selective Service System announced the year-long project yesterday." (*AP*, 24th July.)

This catalogue could be augmented indefinitely, but to sum up: In the

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[10] For a note on civil defense, see Appendix.

[11] The lust of the military "scientists" for new data on radiation effects, in the presence of a social irresponsibility which condones Hiroshima and Bikini atrocities, is a grotesque phenomenon, and reflects itself even in senseless animal "experimentation". At the risk of being called anti-vivesectionist we may cite a few experiments described in *Nucleonics*. In one such, one of two groups of irradiated rats was subjected to drowning. From neatly prepared statistics the profound conclusion is drawn that mortality was higher among the drowned rats. This conclusion was confirmed in later refinements of the experiment where electrically driven treadmills and other means (instead of drowning) were used to exhaust the rats. Presumably these results have deep significance in foretelling the later effects of an atomic attack. In another experiment about 250 burros were imported from Mexico for subjection to gamma radiation. In view of the availability of similar data for mice, rats, guinea pigs, rabbits, monkeys, dogs, sheep, cattle and humans, one wonders what (other than anal compulsion) motivates such an experiment. In another case, an elephant was reported on its way to Rochester for use in a radiation experiment. There seems to exist the misconception that an arbitrary operation performed upon an animal constitutes "science". As a last example, we quote from the article "Thinness Held A Key to A-Bomb Survival" in the Sept. 10 *New York Times*: "Dr. Averill Stowell of Tulsa, Okla., a neurosurgeon, said [to the International College of Surgeons' Congress] that recently declassified information indicated that starved animals, as well as those that were hibernating or living in a cold environment, outlived their well-nourished companions when subjected to lethal X-ray doses. 'This suggests interesting metabolic considerations for survival during an atomic attack', said Dr. Stowell, . . . associate professor of neurophysiology at the University of Tulsa and director of the Tulsa Research Foundation." One cannot help but get from all this an inkling of what American totalitarianism might bring on the concentration camp level.

best possible case, we are promised "unlimited sacrifice to essential military strength . . . extending into the future as far as we can see", . . . "There is no such thing as 'enough' atomic weapons". We are to become brutalized beings, recurrently engaged in "limited warfare", striving to amass an infinitude of weapons and counter-weapons as we plunder our natural wealth, ruining the genes of all humanity with interminable hydrogen explosions, our daily life dogged with mock air raids and new admonitions that "our margin of advantage has been narrowed", swept along in the grim unending game of "moves and counter-moves" that gains in intensity in the same measure as every human and worth-while objective is trampled underfoot.

This monstrous prospect is all that our "leadership" can promise. And of course underlying all is the one promise they dare not make explicit — the iron heel of totalitarianism shall fall also upon America! Taking official prognoses at face value, we should be forced to conclude: in the course of the "crusade" for "the survival of Western civilization", that civilization would be destroyed from within, transformed into an Orwellian monstrosity that would utterly dwarf the Russian barbarism whose menace presumably instigated the "crusade".

But in fact, although such extrapolation is instructive in exposing the bankruptcy of existing "leadership", this state of affairs is impossible of realization. For the "deterrent" ideology is abysmal nonsense: if the armament production continued indefinitely, general annihilation would necessarily intervene at a certain point.

3. The "Deterrent" Ideology and the "Blind Will"

Those committed to this armament production — and there is an increasingly vast segment of the economy which can never again produce consumer goods under capitalism — dare not admit the gruesome implications of their commitment and so seek the customary ideological refuge.

The fallacy of the illusion that sufficiently horrible weapons will prevent war has already been amply demonstrated by history (as Alfred Nobel learned to his chagrin, and many a Nobel prize scientist of to-day has yet to learn) and lies in attributing too great a role to consciousness. To delineate for a patient in the early stages of cancer the horrors of the late stages does not "deter" the disease from progressing. Once it is understood that the very potentates who are supposed to be "deterred" by the H-bomb are themselves compelled by forces which they cannot control, that the wars of our time are not decreed by individual caprice but spring from the innermost logic of the social system — the first step toward dispelling the illusion has been taken.

A weapon is never an autonomous obstacle to war. On the contrary, both weapons and wars owe their existence to the same fundamental social antagonisms. The magnitude of weapons and arsenals thus simply reflects the magnitude of the forces compelling their use — just as the city with the largest police force has the *most* violence. The hydrogen bomb reflects the very sharpest and most implacable of antagonisms, and so must be viewed not as a deterrent to annihilation but as a *prelude* to it. It can be of "benefit" only to the extent that its message is understood and consciousness of doom becomes a spur to the necessary social action.

The doom that comes with the last stage of the social disease is not *now* imminent. Every great social manifestation has its preconditions — those which precede the atomic war are drastic and sweeping, and by no means at hand. Thus, although annihilation is in the logic of the development, current "solemn warnings" against an "atomic Pearl Harbor" or atom bombs smuggled in suitcases are a historical fakery promulgated to serve certain special interests. "Limited" atomic warfare for the "liberation" or "defense" of colonial peoples, etc., is a more immediate possibility: a conscious quest of such warfare has been under way since Korea, and its advocates continue to be "deterred" from their insane plans only by a resistant public.

Lunatics prepared to execute every bestiality, even to taking everything with them into the abyss when they believe their social positions threatened, are always at hand. Like disease germs they infect the social body only in the same measure as the resistance is weakened. Counter-forces and counter-tendencies develop side by side with the compulsion to destroy, because the underlying forces of competition and concentration must continually alienate more and more people in all strata of society from the development.[11A] Already the turbulence in the flow of events becomes increasingly perceptible, and long before "fifty years of cold war" transpire, the juncture will have been reached where society either embarks on a new and rational course or else plunges to its end.

That a blind compulsion to destroy lurks in the innermost mechanism of our present society is generally recognized. But to those for whom the modern crisis is cast in ideological, religious, psychological, Malthusian, or other terms unsuited to the formulation of a fundamentally economic phenomenon, effects appear as causes and the causes of the violent spasms which convulse our society appear as a chaotic and diabolical force, the "blind will". This imprints itself deeply on the consciousness of our time as fatalism, resignation, hopelessness, the foreboding of inevitable catastrophe. Typical was Albert Einstein's reaction in 1950 to the H-bomb decision: "The ghostlike character of this development has its apparently compulsory trend. Every step appears as the unavoidable consequence of the preceding one. In the end, there beckons more and more clearly general annihilation." Writers describe the feeling of "living on borrowed time", "racing with a spectre", etc. The Alsops wrote recently:

> "The development of the hydrogen bomb is now expected to lead on, by the peculiar logic of destructive science, to the early development of guided missiles of inter-continental range. Just as the atomic bomb opened the way to the more terrible hydrogen bomb, so the hydrogen bomb is believed to have opened the way to this final breakthrough in weapons design."

Operation of the "blind will", leading with sure instinct to destruction, may be seen in any number of examples from the atomic program itself. Take for instance the cobalt bomb, apparently unwanted even by the "bombers", e.g.,

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[11A] The recent Indo-China "crisis" illustrates well the role of the counter-tendencies. Here the 'compulsion" for American atomic intervention (to "save" Dienbienphu; see the Alsops' column "Bombs All But Fell", *New York Herald Tribune*) existed, but counter-forces, notably American, British and French popular sentiment prevailed.

> "Donald A. Quarles, Assistant Secretary of Defense, said to-day that the cobalt bomb, which could destroy continents, was scientifically possible but 'not feasible' as an instrument of war. Mr. Quarles . . . declared that no military man believed the 'C-bomb' would be a good weapon of war because the radioactive material it released would kill friend and enemy indiscriminately . . . [it] would be a suicide weapon." (*UP*, 11th April.)

Yet, unless the *New York Times* of 28th March ("Cobalt Bomb Being Developed for Radiation" — cited in *EIA*) errs and has never been corrected, American military scientists, not "deterred" by the insanity of the program, are building a cobalt bomb. Again, we may recall that only a small minority of the principals to the internecine H-bomb struggle of 1949 were willing to go ahead with the program, which was senseless even independently of any ethical or moral considerations. Typical was the objection of Robert Bacher, former AEC member and Physics chairman at California Institute of Technology:

> "With a thousand [A-] bombs, there would be a great many for relatively minor military objectives, and I imagine that the military commanders . . . would have a hard time figuring out what to do with the last hundred. It appears that if any nation has as many as a thousand atomic bombs [the smaller A-bombs of 1950 are meant here — JL] the world is already in the position where any nation could be blasted thoroughly and completely insofar as bombing alone can be effective. If this is the case, just what additional military use is a hydrogen bomb? For the most part it seems that everyone is fascinated by the idea of 'the bigger the better'." (*Bulletin of Atomic Scientists*, May, 1950.)

Yet the H-bomb was built, and with an added touch of perversity proved at Bikini to be "a far cry from the bomb ordered by President Truman in 1950". (*US News.*) The enormity of the bomb stockpile, thousands of A-bombs alone,[12] together with the fact that a huge and growing industry has a vested interest in the continued production of atomic weapons, are further signs that the whole development has run amok and rolls along with a momentum of its own. That if all the atomic bombs in America's stockpile were exploded, *no matter where,* the entire human race would be destroyed by the ensuing radioactivity, is the opinion of a leading physiologist.[13]

One of the most striking features of the blind race to annihilation is "the peculiar logic of destructive science" referred to above by the Alsops, a logic with endless manifestations. For example, the existence of the atomic bomb actuates development of larger and faster bombers to "deliver" the bomb, which in turn intensifies research in radar, guided missiles, etc., for "defense" against attack. But lo! the new defensive techniques are now applicable to building improved missiles to "deliver" the bomb, and so into the next round — all of which brings closer to fruition the ideal of "push a button and destroy a continent".

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[12] Ralph Lapp estimated the American A-bomb stockpile at "thousands of A-bombs" almost a year ago, — an estimate one arrives at on the basis of the price of fissionable material and the atomic energy budget. The *N.Y. Times* of Sept. 10, 1954, reports a statement of Lewis Strauss that the atomic weapons stockpile contains "more weapons to-day by a wide margin than it did a year ago".

[13] Dr. Edgar D. Adrian, Nobel Prize physiologist "said to-day that the human race could not survive if more than a few thousand large atomic bombs were exploded, regardless of where they fell. '. . . We know that unless we are ready to give up some of our old loyalties, we may be forced into a fight which might end the human race. We must face the possibility that repeated atomic explosions will lead to a degree of general radioactivity which no one can tolerate or escape'." (*N.Y. Times*, 2nd September.) In October, 1952, Ralph Lapp and Stewart Alsop wrote that the number of hydrogen explosions which would produce this result (by generation of carbon 14) was estimated by some scientists as "in the low hundreds".

If in view of all these terrors the men who propagate them are not "deterred" but in fact constantly accelerate their pace, shall "deterrence" play a role when the development reaches its breaking point? On the contrary, addicting the public to terror requires larger doses all the time, and brings a progressive deterioration of ethical and moral values. We have seen this process fiercely at work in the last decade. It is worth noting that popular consciousness and dread of war was not less before World War II than it is in the hydrogen age. As the level falls, every existing and past abomination becomes tolerated once the new and greater abomination comes into focus.

4. Totalitarians and Scientists: Whole vs. Half Measures

Totalitarianism now makes its bid also in America, and objectively the role of totalitarianization falls to the great monopolists (whether of steel, oil, or labor) and their political and military brethren. Despite internal antagonisms, greed and even stupidity which sometimes mar their singleness of purpose, they are on the whole aware of their task and maneuver consciously in pursuit of that task. The atomic program affords an excellent framework for such maneuvers, comprising on the one hand coldly economic manipulations[14] (e.g. monopolization of the "peaceful atom") and on the other deliberate attempts to terrorize the general public and regiment the scientific community.[15] By invoking the fetishes of secrecy[16] and

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[14] The economic aspects are not discussed here. The reader will find much of interest in the articles of John Clarkson in *Contemporary Issues* No. 19 and No. 20.

[15] Of course, the entire weapons program is used in the same way.

[16] The hocus-pocus of secrecy cloaking the hydrogen explosions has been vigorously protested by the American press. One reporter at an Eisenhower press conference complained about the "uranium curtain of secrecy". Hugh Baillie, president of the United Press, urged in an address that the public be given thorough firsthand coverage by press and radio of all H-bomb tests, and that observers from many nations be invited. Official announcements, he said, "have revealed little that has not already been published". George Sokolsky, in a column headed "Let's Have Truth About Hellbomb" complained, "Increasingly, Americans are growing dependent upon the mimeographed release for general information and upon carefully monitored magazine articles written by favored journalists who are not permitted to see what they write about". An amusing *Gegensatz* is the annoyance constantly expressed by the scientists (e.g. *BAS* editor Rabinowitch) when one of their faithfully guarded "secrets" screams into prominence through an Alsop column, *Life* article, Senator's "offhand remark", or other "leak".

As is to be expected the freezing of information by the military also retards scientific advancement. We cite just one example, from the *New York Times* of 8th August: "Rocket enthusiasts at the International Astronautical Congress (at Innsbrück, Austria) were dominated by considerations of military security. Two technologists from the U.S. . . . said that the 'scarcity of information on specific projects amounts almost to a black out'. They said 'some military requirements are undoubtedly necessary although many scientists believe they are greatly exaggerated. Information about space flight is largely speculation on little odds and ends of facts released through censorship. One cannot help feeling now and "national security", the atomic program is completely separated from public control, while the associated "security clearance" program provides a powerful tool for the coercion of individuals whose positions enable them to penetrate beneath the surface propaganda. Even the faithful Oppenheimer was pilloried in a desperate attempt to square the ranks and seal the lips of scientists who might wax "unenthusiastic" over the mounting H-bomb madness.

In the present context, the atomic scientists obviously occupy a unique position within the intelligentsia at large. One result of this uniqueness is that they have been particularly vocal concerning the social implications of the atom and have even made timid excursions into politics.

Like any group, the scientists are heterogeneous, embracing fairly outspoken opponents of genocidal weapons like Norbert Wiener, and monomaniacs[17] like Edward Teller of whom one can only say — the world is a little worse for his having lived in it. The majority are somewhere in the middle, and their basic sentiments are perhaps expressed in the closing lines of a song one of them wrote several years ago:

"Take away your billion dollars,
Let's be physicists again."

On the other hand, their actions have been uniformly unsuited to the fulfilment of this wish. Perusal of the *Bulletin of the Atomic Scientists* (*BAS*) since its inception in 1946, reveals one all-embracing characteristic: the absence of *principled* measures. Thus when Bacher opposed building the H-bomb he did so from purely military considerations, proposing instead a program for hunting down Schnorkel submarines. Criticisms of ridiculous "secrecy" and "clearance" procedures, visa policies, etc., are inevitably tainted with the admonition that "national security" is being impaired. To be especially noted is the unprincipled opposition to the Oppenheimer firing, whereby impairment of the thermonuclear program is seen as the main issue. It is not for nothing that the public has remained apathetic to the various "appeals" of the scientists — one sees the strength of the dictum of Paul: "If the trumpet have an uncertain sound, who shall prepare himself for battle?"

The *BAS* is an excellent source for a study in the bankruptcy of purely *formal* (and hence innocuous) politics. While the social crisis deepened the atomic scientists, snugly ensconced on the brink of the abyss, advocated first "world government", then another chimera called "international con-

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[17] The article "Doctor Edward Teller's Magnificent Obsession" in *Life* 6th September quotes an "old friend" as saying, "Edward's monomania about the H-bomb simply leaves me mystified . . . this thing hit him and he couldn't let loose of it".

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then that the guided missile at the moment represents the art of rocketry in a state of military amnesia'." How unfair: the men who are ruining this planet don't give a sporting chance to the men who are trying to get off it.

Not only does "national security" impede scientific progress but, what is far more important, more and more domains of science come under the aegis of the military. As with rocketry, those workers who wish access to adequate tools (not to say mere employment) find themselves increasingly forced into the military framework. This cannot be discussed in detail here; again we cite a single example: The AEC employs an increasing number of biologists, physicians, pathologists, physiologists, soil scientists, marine biologists (to investigate effects of H-bomb blasts), meteorologists, etc.

trol of atomic energy". As the chasm widened one sought "limitation of armaments", pledges "not to use the H-bomb first", "not to use the H-bomb against civilians", etc., and so on into the present period which is characterized by urgent pleas for civil defense measures and evacuation of cities, and profound psychological studies on how to reduce the panic among an atom-bombed population. If these gentlemen ever wondered what had happened to the Atlantic Charter, or why the recommendations of the James Franck report were ignored, or why the Japanese cyclotrons were destroyed,[*] (an act which Oak Ridge scientists called "wanton and stupid to the point of constituting a crime against mankind"), or why the Bikini "tests" of 1946 were held despite the most vigorous protests, or why the militarily irrational H-bomb had to be built, or why their pleas for greater release of manifestly "non-sensitive" information went unheeded, or why the government never honored even the innocuous "solemn pledges" urged on it by the scientists, — if they ever wondered about these and other affronts to their sense of decency, they gave no sign. Spurned, rebuffed, ignored, faint-hearted as the lover of Perrine who asked for a kiss when he should have taken it, the scientists prepare for themselves the same fate: to be locked into a bin and forgotten.

Reading back issues of the *BAS* is like rummaging through the debris of the "disarmament" fiascos of the 'thirties. All social problems are reduced to "the need for international co-operation", "understanding between nations", etc. The solution to the problems posed by weapons of annihilation is to reduce world tension, Albert Einstein informs us. Concert between the cynical diplomats of the West and the blood-steeped policemen of the East is by a strange alchemy to restore equilibrium to a convulsive world; in the wake of bureaucrats scurrying behind secret treaties shall emerge a brighter future for oppressed peoples. Leo Szilard proposes that Truman make speeches in Russia while Stalin make speeches in America, and on another occasion tackles the atomic problem via an open letter to Stalin, born of "my hope that . . . he would perceive the genuine anguish which prompted my writing it and that he might therefore give consideration to its contents".

Particularly instructive for any study of half-measures (perhaps one should say null-measures) is the Emergency Committee of Atomic Scientists, formed in 1947 under the chairmanship of Albert Einstein. Its scope is made completely clear in a circulated statement:

> "These few facts are accepted by all scientists:
>
> 1. Atomic bombs can now be made cheaply and in large number. They will become more destructive.
> 2. There is no military defense against atomic bombs, and none is to be expected.
> 3. Other nations can rediscover our secret processes by themselves.
> 4. Preparedness against atomic war is futile and, if attempted, will ruin the structure of our social order.

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[*] Prof. Nishina wrote in the *BAS* April-May, 1947: "The destruction (Nov. 24, 1945) was accomplished in five full days, by Engineers of the 8th Army, working day and night . . . the cyclotrons in question were constructed through the tireless efforts of a few scores of scientists for a dozen or more years, and at the cost of no small amount of money. The larger cyclotron was just completed (in 1944)." Of course a cyclotron is a purely research instrument and cannot be used to produce fissionable material in sufficient quantity for a bomb.

5. If war breaks out, atomic bombs will be used, and they will surely destroy our civilization.
6. There is no solution to this problem except international control of atomic energy and, ultimately, the elimination of war.

"The program of the Emergency Committee of Atomic Scientists is to see that these simple facts become known to the public. To accomplish this purpose, it will work through all appropriate educational organizations, including the National Committee on Atomic Information and member associations of the Federation of American Scientists.

"The committee does not propose to make governmental policy, either on the national or international level. Its purpose is to make available an understanding of the Atomic Era on which such policy must depend."

The first five points are unassailable, as true to-day as when first formulated (note especially the prophecy of point 4) — although they are unfortunately not now "accepted by all scientists", and (as we shall see) not even by all those who formed the Committee. At point 6 one goes off the deep end,[19] and the purity and impact of the preceding points are vitiated.

In 1947 the Emergency Committee had sallied forth, and disported such slogans as "No one has the right to withdraw from the world of action at a time when civilization faces its supreme test". Two years later it "withdrew" from a world of action it never entered, because,

> "To-day it is evident that this issue [international control of atomic energy] is not capable of a solution except within the framework of a general settlement of the other outstanding postwar issues. *Any fruitful discussion of it will, therefore, involve taking a stand on political questions which, of necessity, must be of a controversial nature. The Emergency Committee does not consider it its task to deal with controversial issues, and we have therefore decided to curtail* [!] *our activities.*
>
> It is not our intention to dissolve as an organization. If, during the coming year, problems arise which we are particularly suited to deal with [e.g., causing the sun to reappear after an eclipse — JL], we shall do so. For the present, however, the Emergency Committee will remain [!] dormant and will solicit no additional funds." (*BAS*, June-July, 1949.)

One alumnus of the Emergency Committee, Harold Urey, went on to advocate ("unhappily") the H-bomb program in 1950. Another, Frederick Seitz, now director of the *Control Systems Laboratory* at the University of Illinois, wrote in the November, 1953, *BAS*[20], that,

> "our present military budget, when viewed in light of the issues at stake and the magnitude of the Soviet armament program, is about half its proper value. If our actions are to lie within the bounds of reason, our military budget at this time should be limited only by ingenuity and productive capacity available. . . . If our economic system and concept of freedom are worth half the value we place upon them in the spoken and written word, they should be capable of withstanding the strain of redoubled effort at this time".

Phillip Morse, a third alumnus, went on to become an "Operations

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[19] The correct "point 6" would be: "It is inconceivable that the problems of atomic weapons can be solved or mitigated by diplomacy, international agreements, treaties, etc." Starting from *these* six points one arrives at a true "Emergency Committee".

[20] This article is a gem for the collector of ideological teratomata (not that there is any shortage). E.g. "Almost all recommendations against expansion of our military facilities are apparently based on false notions of the truly revolutionary intentions of the Soviet leaders . . .". Also one finds a classically pure specimen of the "lesser evil" fallacy, etc.

Research"[21] specialist for the military.

Another instructive half-measure is the declaration on the H-bomb issued in 1950 by twelve eminent physicists (*BAS*, March, 1950). In the beginning appears the *principled* statement:

> "We believe that no nation has the right to use such a bomb, no matter how righteous its cause. This bomb is no longer a weapon of war but a means of extermination of whole populations. Its use would be a betrayal of all standards of morality and of Christian civilization itself."

Shall they go on to conclude that the bomb must not be built? Life is not that simple. They urge "renewed efforts to eliminate this weapon [not yet built! — J.L.] and other weapons of mass destruction from the arsenals of all nations", efforts "made in all sincerity by both sides". Until this is accomplished, the H-bomb is needed to deter against attack in kind, and so "in the meantime we urge that the United States . . . make a solemn declaration that we shall never use this bomb first".

Let us cite as a final example a serious dereliction of duty by the *BAS* (and the Emergency Committee) even within the narrow "educational" framework which they allotted to themselves. It is lamentable that when Truman in January, 1950, presented the American public with the *fait accompli* that he had ordered development of the "super-bomb", the general public had as yet no inkling of what was involved. And it is equally lamentable that the *BAS* voluntarily suppressed material which might have prepared a more informed public opinion for this historic juncture. An editorial by Eugene Rabinowitch in the *BAS*, March, 1950, states:

> "For four years the Bulletin has faced the question whether or not to publish the article by Professor Thirring (or other articles on the subject of thermonuclear explosions which it easily could have obtained) to lend weight to the warnings of scientists that the plutonium bomb may be only the herald of other, more destructive atomic weapons. [Meant is a chapter in the book *Die Geschichte der Atombombe* by the eminent Austrian physicist Hans Thirring, published in 1946. This chapter is a remarkably accurate and prophetic discussion of the hydrogen bomb, including estimates of its power, area of destruction, etc. — J.L.] We have refrained from doing so, because we feared that any discussion of this subject in the *Bulletin* might stimulate the atomic arms race and further exacerbate international relations."

The events of the last four years have of course amply discredited the sophistic considerations which motivated this voluntary censorship, demonstrating once again the futility of unprincipled actions. Free public discussion of *all* questions is a matter of principle, and those who would "educate" the public must first educate themselves in this principle. Ironically, Rabinowitch goes on to say:

> "Now, when the question of attempting the construction of a still more devastating weapon is being deliberated in peacetime [when these lines were written, "deliberation" was of course finished and the "crash program" to build the H-bomb was already under way — J.L.] Americans must be given the opportunity to decide whether, and under what conditions, they want to embark on this course . . . public debate must not be squelched at the present time."

These earlier activities of the atomic scientists and the *BAS* which we have recounted, feeble as they were, do not suffer by comparison with the current activities. Only certain forms have changed; we see new varieties of suspended animation (e.g. the FAS Committee on Disarmament and Atomic Control) where once stood an "Emergency Committee", etc. Where twelve physicists issued a lukewarm denunciation of the H-bomb in 1950, none have reacted similarly to the disclosure in 1954 that the cobalt bomb is being developed. Where Dr. Lee Dubridge deprecated the Bikini "tests" of 1946, not one has even called into question the ravages of the 1954 holocausts.* And the *BAS* lightens the task of the barbarians by diverting whatever fresh streams may still run to its narrow and stagnant channels. As fitting punishment for their crime, the sponsors of the *BAS* should be made to reread scrupulously all their past issues, where they will be haunted by such ghosts as the words of Prof. Philip Morrison, Cornell University physicist:

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[21] "Operations Research" embraces such diverse problems as how to get more megatons for a megabuck, and finding the optimal percentage of Negroes which the Navy can "integrate" each year into non-segregated units. (This last example is right out of the annals.)

> "The community of science will be long delayed in welcoming the armorers of the Nazis. . . . Men were able to remain aloof from the German war effort, and brave and good men like von Laue and Gentner could resist the Nazis even in the sphere of science."

On a later occasion Morrison deprecates

> "many a famous German physicist in Göttingen to-day, many a man of insight and responsibility, who could live for a decade in the third Reich, and *never once risk his position of comfort and authority in real* [!] *opposition* to the men who could build that infamous place of death." (*BAS*, December, 1947, and April, 1948.)

We have not felt it necessary to deal explicitly with the morbid rationalization that because America is a "lesser evil" than Russia (and of course "deterred" automatically from evil acts by its leadership of benevolent businessmen), all barbarism on this side is "justified". For this rationalization is the supreme embodiment of unprincipled and dishonest thinking, and we do not address ourselves to its practitioners. Yet a word may be said, in conclusion of this section, of why it is precisely America (the "lesser evil"!), American ideologies and infatuation, American H-bombs and atomic scientists, that we have taken to task. Our reasons go beyond the fact that America thus far has posed most acutely the question of thermonuclear explosions,** and are bound up with the necessity to approach a solution of the H-bomb question.

First, the existence (or at least remnants) of a democratic framework makes possible educational and political activity directed toward a rational course (in particular, a campaign against hydrogen explosions) — it is not to the Stalinist sewer that one looks to cast a fresh breeze on the world scene. Second, America's decisive weight in the world economy ensures that a rational change of course in America would effect like repercussions in society at large. The preeminent position which has made America a decisive factor in two world wars, and the country *par excellence* of the hydrogen bomb, makes it also the natural cornerstone of a positive development.

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*Since this was written, some signs of activity have appeared. We may mention Professor Sturtevant's article in *Science* on the genetic consequences of the tests, the articles by Inglis and Arnold in the November *BAS*, and a recent series of articles by the Alsops in the *New York Herald Tribune*. It is hoped that this and other important material will be discussed in the pages of this magazine at a later date. — *Ed.*

** Since this was written, the report of a new Russian hydrogen explosion indicates that Russia is more than a token partner in these crimes. — *Ed.*

What is called for as a first step is a principled movement to stop the men who have developed a "vested interest" in exploding hydrogen bombs and poisoning humanity (including themselves!). A demand for the cessation of thermonuclear explosions is forced upon us by elementary considerations of self preservation, conservative in the most profound sense of seeking to conserve the basis by which we all live on this planet. Because the movement is principled, demanding *unconditionally* that *all* hydrogen explosions cease immediately and forever, it can rally the support of people of good will everywhere. And because it is principled and calls all things by their right names (*never* worrying whether this might "further exacerbate international relations"!!) it is automatically dissociated from falsifiers and swindlers, notably the Communists who have bound themselves to wallow in the slime of the Malenkov plan.

It is often argued that, because the hydrogen explosions are a reflection of deeper social problems, only one locus of a cancer as it were, it is futile to limit oneself to such a demand. This is only further ideological legerdemain, based on a false analogy: in the social body, excision of the locus reacts back upon the underlying cancer. It is only by grasping hold of the surface manifestations that man ultimately transforms the "inner logic" of his society. The pseudo-profundity of limiting oneself to the "sublime" problems of "reducing world tension", "promoting international understanding", and so on, is only cheap rationalization designed to furnish shelter from one's social responsibility, and leads to absurd and innocuous "demands" for "peace", "socialism", etc., which is to say, paralysis.[22] To be sure one must always operate with the deepest *understanding* of the social organism, so that clean deft surgery is applied and not quack ointments.

When all the ideological prattling has quieted down one cold fact remains: the hydrogen bomb is with us, and in the explosions at Bikini served notice that the time for deceptions is running out.

5. Perspective for a Movement to Stop the Explosions

We have now completed the ideological circle and returned to our origin, only at a higher vantage point. We see that the elementary demand for cessation of hydrogen explosions is the natural basis for a political movement against the bomb. And that it is not to the enslaved Russian people but to those whose voices can still be heard, that one must look for such a movement. Eschewing all ideologies, making a specific and tangible demand, the movement has as its principled basis biological necessity, and as its life blood the popular protest that has been voiced everywhere against the bomb and the explosions. Its tasks are to unify and extend this popular protest, and to disseminate as widely as possible the best available information concerning the effects of the explosions.

Because the hydrogen bomb is the highest manifestation of modern barbarism it is also the most vulnerable. The "bombers" know this, which is why Americans have encountered a virtual blackout of news on the effects (especially on the Japanese) of the Bikini explosions, supplemented by the fabrications of the Strauss press conference and the morphine of President Eisenhower's "multiplicity of fears" speech 5th April, of which Robert S. Allen tells us,

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[22] Since this was written, the following example was noted in the *New York Times*, 8th September: "The nineteenth congress of the International Co-operative Alliance [a 35 nation organization meeting in Paris] adopted to-day a broad program designed to remove many national barriers and aid the growth of international co-operative relations. . . . The Congress, setting aside a Japanese proposal for an immediate halt in hydrogen bomb experiments, substituted a broader resolution for peace."

> "A major reason for President Eisenhower's reassuring broadcast to the country is the extraordinary volume of mail that has been received by the White House and members of Congress on the hydrogen tests. Significantly, most of the letters are from the Middle West. Virtually all express great alarm and urge either more public information or measures to ban atomic warfare. Many of the letters contain references to papers and magazines published by religious organizations.[23] One senator made a cross-section check of 150 letters he received in a single day and found they came from reputable individuals in his state." (Washington, 9th April.)

It is not for nothing that Admiral Strauss must continually stress the "peaceful" aspects of the AEC's work (as, for instance, at his 16th September speech before the National Assn. of Science Writers, where he complained that "the public has such a strong impression the commission is concerned only with weapons that it continues to receive mail addressed to the 'Atomic Bomb Commission' ". (*N.Y. World Telegram,* 17th September)). And Rep. Sterling Cole of the Joint Committee on Atomic Energy has felt impelled to make the curious pronouncement that "already more lives have been saved and more people helped" by atomic energy than were lost in the A-bombings of Japan. It is not from caprice that the AEC wishes to abandon the Nevada proving grounds; to quote from another recent column of Robert Allen:

> "President Eisenhower has before him a major atomic decision. It is whether atomic weapons should continue to be tested inside the U.S.
>
> "AEC officials and others are urging that further experiments be discontinued at the great firing range near Las Vegas, Nev. Various objections are raised. Chief among them is that nuclear weapons have become so powerful as to make explosions inside the U.S. too hazardous [Ah, the white man's burden! — JL].
>
> "It is argued that last year resulting atmospheric radiation, particularly in the West, increased markedly over previous tests. The intensification was not dangerous [Yet it brought two lawsuits against the government — JL]. But authorities are citing it as an ominous warning of the risks that are inherent in larger A-bombs."

In the same dispatch Allen tells of "the President's still unannounced decision to cancel plans for a series of hydrogen weapons tests in the South Pacific this fall". It is not altruism that has, in these instances, caused the "bombers" to drag their feet, but awareness of the extreme unpopularity of their bombs. It was from a position of weakness that the move to sack Oppenheimer was conceived. Not only anonymous "citizens" but many prominent individuals, such as the respectable Chester Bowles, have deplored the explosions.[24] Author Lewis Mumford has appealed openly for their cessation, as has Albert Schweitzer (letter to the *Saturday Review* 17th July) and Japanese Nobel Prize physicist Hideki Yukawa.

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[23] E.g., the influential and undenominational Christian weekly *The Christian Century,* which devoted several consecutive editorials to the H-blasts, wrote: "Hasn't the time come to call a halt? We think it has. In the light of what happened on March 1, and the terror already unleashed in Japan, we hope that the second hydrogen explosion scheduled for this month is called off. . . . Why are more tests needed? We now know that we have the hydrogen bomb . . . in a form deliverable on any target anywhere in the world. . . . What more do we need to prove?" It is significant also that the Pope's Easter message dealt at length with the H-bomb, as did many sermons. Rev. Dr. J. S. Bonnell declared that "Easter dawn broke upon the ancient world with a might, majesty and power like that of the hydrogen bomb".

As we travel outward from the United States we find protest more overt and more direct. Anne O'Hare McCormick wrote in the *N.Y. Times* 7th April:

> "The political explosions that have followed the latest series of hydrogen bomb tests are in some ways as frightening as the bomb itself. The emotional reactions to the stupendous blasts in the Pacific have spread far beyond the radius of their destructive power. They have whipped up shrill protests against continuing the tests in the Japanese Diet, the British House of Commons, the Parliament at New Delhi."

Drew Middleton wrote in the *N.Y. Times* 4th April:

> "It is difficult to escape the conclusion that the most serious political casualties from the hydrogen weapon explosions in the Pacific have been suffered by those Governments, in Britain and in Europe, which are the most friendly to the United States. In London, a citadel of the Atlantic alliance, the [Churchill] government is under heavy assault by a Labor party so appalled by the Pacific experiments that it has forgotten — for the time being, at least — its internal feuds."

Nor was only the Labor Party "so appalled" — such diverse publications as the *Manchester Guardian* and *New Statesman and Nation* also requested that the tests be discontinued. *UP* Staff Writer Poats wrote from Tokyo 14th April:

> "The wave of anti-Americanism that swept Japan was not the only result [of the tests]. Fear of the awesome power of the H-bomb brought a crisis [to the Churchill government]. In Australia,[25] France and India there were demands that all H-bomb tests be halted. The Disarmament Commission of the UN was summoned into new, emergency session."

Howard K. Smith, top European correspondent for CBS, reported that fear and demands for the cessation of the Bikini tests were widespread on the continent. Intense were the pressures that caused French Foreign Minister Bidault to denounce the H-bomb scientists as "sorcerer's apprentices" and motivated the headline in *France Soir*: "A-Bombs and H-Bombs; Let Us Stop the Explosions". Drew Middleton wrote, "Despite denials in Washington, the Italians also appear to believe that the Hydrogen weapons got out of hand".

Moving closer to ground zero, we find stronger reactions. Symbolizing the Indian reaction, Prime Minister Nehru decried "the creation of a Frankenstein" and requested that no further explosions take place. Later

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[24] Sen. Mansfield of Montana, in a Senate speech "said to-day the U.S. was denying individual right to Marshall Islanders by turning their area into atomic testing grounds. . . . Mr. Mansfield said 'we should be assuming a responsible attitude toward the damage that has been done, but instead we have sought to minimize the situation' ". (*UP*, 14th June.)

[25] According to the *New York Times*, 30th March: "Further comment on the Bikini tests was made here to-day by the Defense Scientific Adviser to the Australian Government, Prof. L. S. Martin, who said that 'for the first time, I am getting worried about the H-bomb'. Dr. Martin, who holds the Chair of Physics at Melbourne University, continued: 'I cannot say I think it would be wrong to explode a hydrogen bomb on or near Australia [a project the British have considered — JL] because I am defense adviser [!]. . . . It looks as if at the last explosion the fission was greater than expected and for the first time the scientists were caught out — and they are a bit more worried about it than anyone else'."

India introduced at the UN a resolution that America has no right to conduct atomic explosions in a trust territory.

It is almost superfluous to describe the reaction of the Marshall Islanders or the Japanese people, whose lives were touched directly by the cloud with no silver lining. No people was ever moved by a purer, more elementary necessity than that from which the Marshallese submitted to the UN their "Complaint regarding the explosion of lethal weapons within our home islands". This petition reads in part:

> "The Marshallese people are not only fearful of the danger to their persons from these deadly weapons in case of another miscalculation, but they are also very concerned for the increasing number of people who are being removed from their land. Land means a great deal to the Marshallese. It means more than just a place where you can plant your food crops and build your houses; or a place where you can bury your dead. It is the very life of the people. Take away their land and their spirits go also.
>
> "The Marshall Islands are all low coral atolls with land area where food plants can be cultivated quite limitedly, even for to-day's population of about 11,000 people. But the population is growing rapidly; the time when this number will be doubled is not far off.
>
> "The Japanese had taken away the best portions of the following atolls: Jaluit, Kwajalein, Eniwetok, Mille, Maloelap, and Wotje [to be fortified for World War II]. So far, only Imedj Island on Jaluit atoll has been returned to its former owners.
>
> "For security reasons, Kwajalein Island is being kept for the military use. Bikini and Eniwetok were taken away for atomic bomb tests and their inhabitants were moved to Kili Island and Ujelang atoll, respectively. Because Rongelap and Utirik are now radioactive, their inhabitants are being kept on Kwajalein for an indeterminate length of time.
>
> " 'Where next?' is the big question which looms large in all our minds."

In Japan the thermonuclear explosions are a central national issue, and the blasts at Bikini are widely regarded as simply a third atomic assault on Japan. One recognizes from diverse news items the universality of sentiment: Followers of the Omotokyo sect of Shintoism collected and submitted to the UN two million signatures opposing manufacture, use and test of hydrogen and atomic bombs; mayors of 400 cities drafted a similar resolution at the 16th National Mayor's Conference; resolution by the National Christian Council; record May-day demonstration in Tokyo displaying huge papier-mâché mushroom cloud and giant paper tuna fish; a national "death watch" when *Fukuryu* crewman Kuboyama fell into a coma*; the *Oriental Economist,* Tokyo financial journal, devoted a significant part of three consecutive issues to the H-bomb. Even the wretched Yoshida government has been forced to make equivocal protests.

Such are the raw materials with which an anti-bomb movement can begin, and although realism dictates that the "bombers" will not easily be deterred, these materials are considerable. To stop the American explosions would itself be a popular victory of a high order. As the radioactivity died away (with the "Why They Hate Us" articles now part of America's daily reading) the enhanced consciousness necessarily developed in the successful campaign could move on to the positive goals which would appear in the void left by the negation of insane policies.

18th September, 1954.

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*Aikichi Kuboyama died, aged 39, on 23rd September, 1954, a victim of the H-Bomb tests. — *Ed.*

APPENDIX

A NOTE ON "CIVIL DEFENSE"

According to *U.S. News and World Report,* 9th April, a typical deliverable H-bomb has a radius of total destruction of three miles; produces "devastation" out to twelve miles, and "serious blast damage" to forty miles. It would produce mass casualties out to ninety miles, and (due to radioactivity) evacuation would be necessary of all areas within 175 miles of the blast. Dropped on Philadelphia, for example, *U.S. News* claims one bomb would cause death or evacuation of 30 million people, including four of the five largest Eastern cities. It is not necessary to extrapolate to imagine what a dozen such bombs would do. Strauss himself told reporters that the bomb could "take out a city . . . any city". *Newsweek,* 5th April, points out that the only way to save the population of a target city is by evacuation of its inhabitants, an operation requiring, at best, two to six hours for a large American city; and that present detection and alarm facilities could guarantee no more than a 15 minute warning. *Life,* in its 12th April editorial, states flatly: "The device which vaporized Elugelab (1952) also obliterated all previous plans for U.S. Civil defense". *Time* referred to civil defense as an "outmoded art". It is not hard to see why this is so: it is universally conceded by the CD planners that to "prevent delivery" is the only defense. Yet CD chief Val Peterson tells us (*BAS* September, 1953):

> "We must remember that even with guided missiles for air defense, and with the jet aircraft, and with the radar fence, you must still expect somewhere in the neighborhood of 50 to 60 per cent enemy penetration for quite a while in the future."

Sen. Symington informs us that in five, or at most ten years, Russia will have supersonic guided missiles with hydrogen warheads "against which there is no defense". And under the screaming heading "Hydrogen Rockets Near For War of Continents", the Alsops write that,

> "the hydrogen bomb has brought the era of pushbutton war with inter-continental missiles very appreciably nearer. . . . The time when the 'birds will fly', as the missile developers say, is now officially estimated to be as close as 1960. First tests in 1957-58 are not thought to be impossible. . . . Such missiles must also pick up fantastic speeds, far above the 1,500 to 2,000 miles an hour of the V-2 of the last war".

If civil defense has become meaningless, what shall one make of, e.g., Gordon Dean's admonition (*BAS*, January, 1954) that,

> "if we wish to mitigate disaster we had best turn [our] serious attention to this business of civil defense and the creation of early warning devices which will permit orderly evacuation of people from target areas".

It would seem that Dean overlooks the difficulties inherent in giving two hours' warning of the approach of a missile whose total time of flight is fifteen minutes.

Coventry, one of Britain's most damaged cities in World War II, showed its cognizance of reality when its city council decided on 6th April to abandon all civil defense measures as a waste of time and money. Birmingham has done likewise. But the American civil defense program continues to roll further into a blind alley. Speaking on a television broadcast where an official film of the Ivy "shot" had been shown, Val Peterson told Americans: "What you have just seen [affects] the safety of our communities and the well-being of our homes and families", and asked for preparations at home to guarantee "assurance that the American people are prepared to withstand any assault". He admitted however that "this is no simple matter". How the fingers of the dead hand of bureaucracy will continue to twitch long after the brain has ceased to function is seen clearly from an article in the *N.Y. World Telegram* of 2nd April, under the heading "Not Excited Over H-Blast":

> "Lt.-Gen. C. R. Huebner, State Civil Defense Director, and Leonard Dreyfuss, Jersey chief, said they were going to stick to their original atom bomb defense plans. 'With the H-bomb, of course, more people are going to get killed', General Huebner conceded. 'It can't be helped, so there's nothing to get excited about'. The city commissioner of civil defense, Herbert R. O'Brien, echoed the state chief's attitude . . . [Mr. O'Brien] affirmed his faith in the old duck and cover' policy. . . . Mr. Dreyfuss said to-day that he saw 'no practical difference between an A-bomb and the new H-bomb other than the fact that civil defense forces must deal with a larger problem'. . . . Gen. Huebner said he was 'sure the basic plan we now have in effect will work. The safest place is in your own home. . . . A slit trench is great'."

Alas, general,[26] the H-bomb is also "great" and makes its own slit trench — that made at Eniwetok 1952 extended 175 feet beneath the ocean floor.

Of course, in all fairness it must be acknowledged that wherever an H-bomb drops, there will exist a large fringe area, wherein the concept of taking shelter, caring for wounded, etc., will have meaning (although New York City is hardly likely to be such a fringe area). In case of a massive attack, however, such measures could at best assure that a few tens of millions of miserable, starving wretches would be turned loose upon a radioactive wasteland, the greater part of whose productive capacity had been destroyed. It therefore seems pointless to pester our populace, brutalize our children, and squander upon CD energies and resources that could best be exerted in defending humanity *now* against the direct threat posed by the hydrogen bomb enthusiasts.

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[26] Recent news items indicate that Gen. Huebner's ardor for slit trenches has cooled appreciably.

Karl Berninger

THE BOMB AND THE WEATHER

EARLY in the summer of 1954, the Japanese news service Kyodo issued the following brief dispatch:

> Tokyo, June 5 (Kyodo)[1] — "The Japanese Meteorological Society June 5 appealed for prohibiting the manufacture, testing, and use of hydrogen bombs, complaining that great quantities of radioactive debris forced into the stratosphere by H-bomb explosions will have an adverse effect on world weather conditions and render accurate weather forecasting difficult."

More detailed reports followed. For example:

> Tokyo, July 31 (Kyodo) — "A group of Kochi University professors is planning a campaign to stir up world opinion against thermonuclear experiments. . . . They decided to embark on the movement after studying data on the Bishop's ring observed recently around the sun and moon by researchers at the Meteorological Research Institute in Tokyo. After their studies on the phenomenon, which they said was caused by the recent Bikini H-bomb tests, the professors, including Dr. Takeo Sawamura of Kochi University, reached the conclusion that the ring, a diffraction corona caused by dust particles, is sure to bring on world-wide crop failures. A similar phenomenon was reported observed after the great eruption of Krakatoa in Java in 1883 and after the explosion of the Katmai volcano in Alaska in 1912. Through the eruptions, volcanic ashes are reported to have penetrated the stratosphere and covered the earth. This, it is said, weakened the sunlight by some 20 per cent, adversely affecting crops. . . ."

To our knowledge, these observations have not yet been conscientiously reported to the non-Japanese world. It is therefore our purpose here to investigate the context out of which they arose, and to draw out the implications contained therein. We shall see, both theoretically and as a matter of record, that the hydrogen explosions of spring, 1954, have initiated a meteorological disaster of unusual intensity and of world-wide extent.

This study will develop, with the help of the analogy of vulcanism, the following thesis: The bomb, upon explosion, reduces some of the surrounding solid matter to dust, or ash, which it blows high into the atmosphere. This ash (a surprisingly small quantity is sufficient) intercepts a considerable fraction of the earthbound sunlight, which would otherwise deliver light and heat to the earth and to the lower atmosphere, resulting in generally lowered temperatures, an altered pattern of precipitation, and subtler phenomena. Before examining in detail the record of recent weather, it seems desirable to consider some matters of a somewhat technical nature.

I. The Physics of Stratospheric Dust

In developing our theoretical argument, we must inquire how it is that tiny particles of ash can exclude a palpable portion of the normal supply of sunlight from the earth for a significant period of time. This requires that we determine (a) the dimensions of the effective particles; (b) the length of time of their effectiveness, i.e. the period during which they can remain suspended in air; and (c) the specific effects of these particles on the solar and terrestrial radiation (light) which must pass through them —

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[1] All dates without years refer to 1954.

articularly the effect on the temperature of the earth and the lower tmosphere.

The first piece of information is supplied by measurements on the Bishop's ring which accompanies extensive distribution of dust in the upper atmosphere. Through the theory of physical optics, the dimensions of the ring imply the average linear dimensions of the particles giving rise o this diffraction pattern. In his basic work on meteorological physics, *Physics of the Air,* W. J. Humphreys writes:

> "For two or three years after the eruption of Krakatoa, in 1883, also after the eruption of Mont Pelé, and Santâ Maria, in 1902, and, again, after the eruption of Katmai, in 1912, a sort of reddish-brown corona was often, under favorable conditions, observed around the sun. It was from 10° to 12° wide, and had, to the outer edge, an angular radius of from 22° to 23°. This phenomenon, known as Bishop's ring, clearly was a result of diffraction of sunlight by the particles of volcanic dust in the upper atmosphere, and therefore, it furnished a satisfactory means for determining the approximate size of the particles themselves. The subject has been rather fully discussed by Pernter, who finds the diameter of the particles, assuming them spherical, to be approximately 185×10^{-6} cm., or 1.85 microns. . . .
>
> "Now, since the width and angular dimensions of Bishop's ring, as seen at different times and different places, have varied but little, the above value, 1.85 microns, may, provisionally, be assumed to be the average diameter of those particles of volcanic dust that remain long suspended in the atmosphere."[2]

In order to determine the time of suspension of the dust particles, some nowledge of the structure of the atmosphere is required. This global nvelope of air is roughly divisible into troposphere (or convective region) nd stratosphere (or isothermal region). The former is the region of weather — of vertical air currents, strong winds, and precipitation — xtending from ground up to an altitude of about 11,000 metres. The latter xtends from there upward, maintaining a nearly constant temperature up o at least 35,000 metres, and is free from vertical convection, clouds, and urbulence.

Dust in the convective region is probably washed out by precipitation in matter of weeks. However, ash gotten into the isothermal region — by whatever process — must drift about in suspension until pulled by gravity, gainst the viscous resistance of the surrounding air, into the lower tmosphere. One may calculate the terminal velocity of a spherical particle escending under gravitational attraction through a viscous medium.[3] From his, one can compute time of fall from some initial to some final altitude.

Taking 2.3 gm./cm.^{3} (grams per cubic centimeter) for the average density f volcanic ash, and the previously determined average diameter for the articles (assumed solid spheres), Humphreys arrives at the figure of about ne year as the time of fall from the top of the isothermal region (35,000 meters) into the region of weather (11,000 meters).[4] However, two considerations may increase the time of fall to several years: First, the ash may be elevated higher than 35 kilometers; and second, it very likely consists of thin-shelled bubbles or fine fragments thereof, rather than the solid spheres assumed in the calculation, with both the decreased mass and the greater viscous drag leading to a smaller terminal velocity. (The latter point will prove very important in another connection in Section II.)

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[2] W. J. Humphreys, *Physics of the Air,* 3rd ed., New York, McGraw-Hill, 1940, 591.

[3] Stokes's law gives the terminal velocity of such a particle in terms of (a) the iameter and mass of the particle, and (b) the density and viscosity of the medium.

[4] Humphreys, *op. cit.,* p. 593.

In connection with the remaining consideration, a few prior remarks on the energy balance of the earth are needed. The radiation emitted by the sun is concentrated mostly in the shorter (visible) wavelengths. The earth also radiates, but mostly in the longer (infra-red) wavelengths — because of its vastly lower surface temperature. Stratospheric dust radiates at the still lower temperature of the isothermal region (about —55° C.). Every unit of matter reflects and absorbs, in different proportions for each wavelength of the spectrum, portions of any radiation which falls upon it. Left to itself (with constant external conditions) a given system of matter will eventually attain a balance of radiation, or a steady state, with the temperatures, rates of absorption and reflection, and intensity of radiation of each component material part adjusting themselves to constant values.

The earth plus its atmosphere is such a system, with a constant flux of sunlight superposed. The earth and the troposphere (which together constitute our palpable environment), make up the major portion of this system while the stratosphere and its dust may be looked upon as a thin surrounding veil, capable of slightly perturbing the condition of the central core. Any change in the quantity of stratospheric ash will upset — through the absorptive and reflective properties of the ash — the previously pertaining radiation balance, and force evolution toward a new steady state. In the new condition of balance, the amount of radiative energy leaving the stratosphere for outer space must, as before, equal the amount received from the sun. However, the internal balance, between core and sheath of dust, will be upset, so that more or less energy is absorbed by (and reradiated by) the earth and lower atmosphere — corresponding, respectively, to a rise or fall of temperature in the inhabited portion of the system.

Concerning first the absorptive property of dust in the stratosphere, and its differential effect on the incoming solar and outgoing terrestrial radiation, Humphreys finds that:

> "The total amount of radiation reaching the earth is increased, unchanged, or decreased, owing to absorption by the surrounding dust layer according as the dust's coefficient of absorption [specific absorption] of terrestrial radiation is greater than, equal to, or less than, its coefficient of absorption of solar radiation. . . .
>
> "Now, in the case of many, if not all, rocky materials, such as make up the particles of volcanic dust, the coefficient of absorption is much greater for terrestrial radiation than for solar radiation. . . ."[5]

Thus, the probable effect of the absorptive capacity of excessive elevated dust is to increase the quantity of radiative energy available to the earth and thereby to bring about somewhat higher terrestrial temperatures.

The nature of reflection depends fundamentally upon the ratio of the linear dimensions of the dust particles involved to the wavelengths of the incident radiation. Humphreys concludes that, for particles small enough to remain long suspended in air (those of average diameter associated with the Bishop's ring phenomenon) the ash "is some thirtyfold more effective in shutting solar radiation out than it is in keeping terrestrial radiation in."[6] The technical point involved is this: The particles of ash have diameters which are much larger than most of the solar (visible, shorter wavelength) and much smaller than most of the terrestrial (infra-red, longer wavelength) radiation wavelengths. Accordingly, the particles look like an extensive wall to the shorter solar wavelengths, a good part of which may be reflected back into outer space; whereas they look like pebbles on a smooth road to the longer wavelength terrestrial radiation, most of which is simply scattered, and little reflected back earthward. Thus, the probable effect of the reflecting property of an excess of stratospheric dust is to reduce surface temperatures on earth.

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[5] *Ibid.*, p. 589.

[6] *Ibid.*, p. 596.

It now remains only to determine the dominant of the two effects — absorption or reflection. The answer could be worked out theoretically, but may be arrived at more easily in terms of an empirical case. Since the ash from the explosion of Katmai volcano in Alaska (6th June, 1912) caused noticeable distortion of world weather, Humphreys uses a pertinent datum to solve the problem.

In the months succeeding this eruption, a number of observers measured the intensity of sunlight received by the earth. For example, Abbot and Fowle "were engaged, respectively, at Bassour, Algeria, and at Mount Wilson, California, in measuring with the pyrheliometer and spectrobolometer the intensity of the radiation of the sun".[7] They found that "The total direct radiation of the sun was reduced by nearly or quite 20 per cent at each of these stations when the effect reached its maximum in August".[8] In a standard optical attenuation calculation, Humphreys estimates that, in order to bring about this reduction in sunlight received by the earth, about 340,000 particles of dust must have been suspended over each square centimeter of earth (assuming uniform distribution), which means a total of 1.73×10^{24} floating particles from Katmai. At a density of 2.3 gm./cm.^3, this amounts to 7.1×10^{12} grams, or 7.8 million tons of elevated matter.

This is actually a surprisingly small quantity of matter to shut out one-fifth of the usual intensity of sunlight from the entire surface of the earth. In order better to visualize the quantity, 7.8 million tons at the stated density would occupy a cube less than 160 yards on each side — a negligible amount compared to the vast masses of air, earth, vegetation, and water involved in maintaining the general radiation balance of the earth.

The quantity of elevated dust determines the rate at which radiant energy reaches, and is reradiated by, the earth and lower atmosphere, and thereby determines the surface temperature of the earth.[9] Humphreys estimates that, had the Katmai ash remained indefinitely suspended, the mean world temperature would have been raised less than 0.3°C. as a result of absorption and would have decreased by 6° to 7°C. as a result of reflection.[10] One can, for any case of practical interest, show that this differential result holds — that is, that reflection quite generally dominates absorption, and that an increase of stratospheric dust must bring lowered mean temperatures to the human environment.

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[7] C. G. Abbot and F. E. Fowle, "Volcanoes and Climate", *Smithsonian Miscellaneous Collections*, Vol. 60, No. 29, March 28, 1913, p. 1.

[8] *Ibid.*, p. 24.

[9] According to the Stefan-Boltzmann law, the total energy radiated per unit time is proportional to the fourth power of the absolute temperature of the surface, for full radiators and absorbers ("black bodies"), and less for partial radiators.

[10] Humphreys, *op. cit.*, pp. 598-599.

From the foregoing, it is apparent that the conception of obscuring of sunlight by atmospheric dust rests on a solid basis of physical knowledge. Provided the dust is elevated into the stratosphere, its effects may continue noticeable for as long as several years. The magnitude of these effects will depend, of course, upon the quantity of ash gotten into the stratosphere. As we shall see (in Section III), major volcanic activity is capable of floating sufficient dust to cause serious climatic disturbances; we shall now demonstrate that the bomb is, in all probability, capable of elevating comparable amounts of ash.

II. Quantitative Estimate of Ash from the Bomb

One feels compelled at the outset to remark that the files of the Atomic Energy Commission undoubtedly contain enough information — now withheld from the public — to settle decisively the question of how much ash of the appropriate size particles can be floated by a bomb of a given energy, and to what altitude. We must, however, be content with unclassified gleanings from the public press. Fortunately, these seem to be sufficient to make the problem tractable.

As a standard of reference, we recall 7.8 million tons (the total mass of correct-size dust from Katmai) as the order of magnitude of mass of similar ash which the bomb must elevate if we are to contend that it can alter world-wide meteorological conditions. That such a total mass is available for elevation in some form may be ascertained from the announced dimensions of the crater blown in the ocean floor by the small pilot-model (only 4 to 7 megatons energy release) hydrogen bomb exploded at Eniwetok in November, 1952.

Even if one neglects the coral island which once sat atop this pit, the total volume of matter removed cannot be markedly less than the square of the crater's radius times its depth, which measure, respectively, one-half mile and 175 feet. Multiplying this by the density of the volcanic ash, which can differ but little from the true density of the ejected matter (which difference will not affect an order of magnitude calculation), we arrive at about 48 million tons for the quantity of matter removed.

In the tests of spring, 1954, at least five bombs, of approximately 20 megatons energy release each, were exploded (a proposed 40 megaton single blast may or may not have occurred) — a grand total of approximately 100 megatons energy release. Since this energy release is about 20 times that of the 1952 bomb, it is likely that about 20 times as much matter was elevated, i.e., almost 1,000 million tons of matter.

Thus, if only 7.8 million tons out of 1,000 million — or about one per cent of the total matter removed by the tests — was elevated, in grains of the appropriate dimensions, into the stratosphere, the bomb would be as efficient as a large volcanic eruption at upsetting world weather. This does not seem to be an unreasonable efficiency requirement.

All possibilities are, of course, limited by the 100 megatons of energy available. This energy is distributed in various ways — light, heat, and kinetic energy of all sorts of debris (including those particles which are of the correct size to obscure sunlight and remain long suspended in air). We must therefore see what sort of efficiency requirement on the available energy will permit elevation of 7.8 million tons of ash.

The energy (in ergs) required to lift a mass (in grams) to a given altitude (in centimeters) against gravitational acceleration (980 cm./sec.^{2}) is the product of the mass by the altitude by the gravitational acceleration.[11] Taking 35,000 meters for the altitude, and using the previously calculated mass of Katmai ash (7.1×10^{12} gm.), we find that about 2.4×10^{22} ergs are needed to elevate an amount of ash equivalent to that floated by major vulcanism. But the quaint language of the thermonuclear age uses the megaton as the unit of energy. Since one megaton is at least 3.4×10^{22} ergs[12] the elevation energy of the Katmai ash is not more than 0.8 megaton.

Thus, if only 0.8 megaton out of 100 — or about one per cent of the energy available in the experiments of last spring — went toward elevating small particles of ash, the bomb would be as good a producer of climatic change as was Katmai. Again, the efficiency requirement seems to be reasonable.

However, we have very likely overestimated both the energy and mass efficiency requirements for the following reason: These calculations are based upon the assumption that the ash particles are solid spheres. As Humphreys points out, and as we mentioned in the previous section, they are more apt to be thin-shelled bubbles or bubble fragments. This consideration may well reduce the mass of the average dust particle by a factor of ten or so, and hence both the efficiencies just computed from one per cent to about one-tenth of one per cent — quite probably realized in practice, and a possibility beyond question.

Volcanic eruptions definitely tend to generate particles in the form of pieces of thin-shelled bubbles of matter. This structure has been noted by researchers after many eruptions. Its probable origin is as follows: Water trapped in vesicles in the erupted matter is turned to steam by the heat of the vulcanism, causing the blown-up, bulbular, form. As the bubbles rise, they experience a rapid drop of pressure and temperature, causing them to shatter. According to the Royal Society's monumental study on Krakatoa:

> "Messrs. Murray and Renard have found by a microscopical examination of Krakatoa pumice that its fracture has probably been owing to a tension like that observed in Rupert's drops. The particles have ragged edges which show disruption of a vacuolated or bubble-like structure. A rapid cooling and decrepitation must take place in the passage of the heated pumice masses through the air; and thus a vast quantity of extremely finely-divided matter be carried into the higher atmosphere. . . ."[13]

It cannot legitimately be objected that ash from the hydrogen bomb tests will be coral, rather than volcanic material (since the bombs were exploded on coral reefs), and thus that the effect envisaged here may not occur in practice. This is because coral reefs are merely calcite fringes sitting atop underwater mountains (which nearly reach the surface) of volcanic origin. According to Leet,

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[11] This simple formula is the approximation for cases where the radius of the earth (about 4,000 miles) is much larger than the elevation. In the present case (elevation about 20 miles) it is quite accurate.

[12] As follows: One megaton is the energy released by the combustion of one million tons of TNT (trinitrotoluene). The energy of combustion of TNT is at least 880 calories per gram (*International Critical Tables*, 1st ed., McGraw-Hill, 1930, Vol. VII, p. 490). One calorie equals 42 million ergs, and one gram equals 1.1×10^{-6} ton.

[13] G. J. Symons ed., *The Eruption of Krakatoa, and Subsequent Phenomena,* Report of the Krakatoa Committee of the Royal Society, London, Trubner & Co., 1888, p. 183.

> "No discussion of volcanic islands is complete without the inclusion of coral islands, for these are all volcanoes at heart.
>
> "Within about 30 degrees north and south of the equator, in clear water at about 68° Fahrenheit, certain corals and related organisms built calcium carbonate reefs down to depths not exceeding about 100 feet. This limitation upon depth requires that they start from a previously erected platform if they are to reach the ocean surface in the deep waters of the Pacific, Indian, or Atlantic oceans. Volcanoes supply the platforms. . . ."[14]

Thus, most of the airborne dust from the bomb is probably of volcanic origin, and must behave physically like that from a natural volcano.

The circle of logic appears to be closed: (a) Volcanoes always produce the stated type of ash. (b) The bomb is, for present purposes, simply a man-made volcano. (c) Therefore, thermonuclear ash (at least that now above us) should be of the stated structure, and our estimated efficiency requirement of one-tenth of one per cent stands.

Though a test series of bombs may not be the equal of a Krakatoa in total energy release, it is not difficult to see why it can be at least as effective, by being much more efficient for elevating ash. Nuclear explosions occur amid temperatures unheard of in volcanoes, and proceed with unimaginably greater rapidity. (A volcanic eruption may be spread out over minutes, hours, or even days.) A violent spasm of vulcanism usually destroys part of a mountain, expending a great portion of its energy in accelerating large and small rocks, great quantities of earth, trees, tons of liquid lava, and probably much ash whose particles are far too large to rise high into (or remain long suspended in) the stratosphere. The higher temperature of the bomb is much more certain to vaporize the matter around it, thus assuring small ash particles, while the suddenness of a nuclear explosion tends to focus all ejected matter in an upward direction. Whereas a volcano has time to spread its energy around (loosen parts of mountains, etc.), the bomb strikes with such speed that the ocean floor and the surrounding mass of water should behave very nearly as rigidly reflecting walls.

Photographs of nuclear explosions tend to bear out this opinion. Who is not familiar with the rapidly rising mass of matter (often almost a vertical column) which later forms the famous mushroom cloud?

Finally, we must add that the cloud from the 1st March, 1954, explosion at Bikini rose to a height of some twenty miles (very nearly the 35,000 meters used in our calculations) and that Japanese meteorologists have since observed Bishop's ring[15] — certain proclamation that sunlight-obscuring ash is in the upper atmosphere.

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[14] L. Don Leet, *Causes of Catastrophe,* New York, McGraw-Hill, 1948, p. 152.

[15] There is no mistaking Bishop's ring for the common halo (formed by atmospheric ice crystals). Whereas the latter is a refraction phenomenon, the former is a diffraction pattern, with reversed order of colors. In Bishop's ring the order of colors is — from center outward — blue first, red last.

III. Vulcanism and Climate

There are, as yet, no records to indicate the pattern that thermonuclear weather might be expected to assume. However, there does exist a lengthy record of observation of vulcanism and of its related climatic conditions, including seventy-odd years of accurate measurement and successful theoretical work by meteorologists and physicists. Since the bomb produces causal influences not unlike those of major volcanic activity, it is possible from this record to make instructive deductions concerning that which the bomb has in store for us.

Returning to Humphreys's study, we read:

> "Direct measurement of solar radiation by means of the pyrheliometer, an instrument that measures the total heat of sunshine, shows marked fluctuations from year to year in the intensity of this radiation as received at the surface of the earth. This subject has been carefully studied by Dr. H. H. Kimball, of the United States Weather Bureau, who prepared the accompanying table. . . ."[16]

The table mentioned records average yearly pyrheliometric intensities — averaged over observing stations in six parts of the world — for the years 1883 through 1913.

> "The marked decrease in the pyrheliometric readings for 1884, 1885, and 1886, doubtless were largely, if not almost wholly, due to the eruption of Krakatoa in the summer of 1883; the decreased values of 1888 to 1892, inclusive, occurred during a period of exceptional volcanic activity, but were probably owing essentially to the violent eruptions of Bandaisan (1888), Bogoslof (1890), and Awoe, on Great Sangir (1892); the low values of 1903 to the eruptions of Santâ Maria (1902), Pelé (1902) and Colima (1903); and the low values of 1912-1913, to the explosion, June 6, 1912, of Katmai. . . .
>
> "By July, 1914, the depression due to the dust from Katmai had fully passed, and from that date to the present (October, 1940), there have been no violent volcanic eruptions and the pyrheliometric values have been remarkably constant except for a slight unexplained irregularity in 1920-1921.
>
> "There is, then, abundant pyrheliometric evidence that volcanic dust in the upper atmosphere actually does produce that decrease in direct solar radiation that theory indicates it should, and, as the theory is well founded and the observations were carefully taken, this mutual confirmation may be regarded as conclusive both of the existence of volcanic dust in the upper atmosphere (isothermal region) and of its efficiency in intercepting direct radiation from the sun."[17]

The only conceivable flaw in this deduction is the possibility that the intensity of light radiated by the sun has, coincidentally, decreased on each of the above-listed occasions. This intensity can be altered by changes in the dust content of the sun's atmosphere and in the surface temperature of the sun. Both these factors vary during periods of sun-spot activity. However, the latter has a nearly regular eleven-year cycle, whereas volcanic activity and depressions in pyrheliometric intensity show no such periodicity. Humphreys compares data on the number of sun-spots appearing per year, for the years 1883-1914, with the pyrheliometric data. The lack of correlation is obvious. Thus,

> ". . . the great drops in the pyrheliometric values occur simultaneously with violent volcanic explosions, as already explained, and not at the times of sun-spot changes. Hence, it appears that the dust in our own atmosphere, and not the condition of the sun, is a very important, if not the controlling, factor in

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[16] Humphreys, *op. cit.*, p. 601.

[17] *Ibid.*, p. 602.

determining the magnitudes and times of occurrence of great and abrupt changes of insolation intensity at the surface of the earth."[18]

Measurements show that, for a period often as long as several years after major volcanic activity, the solar radiation received by the earth is reduced by something like 20 per cent. Therefore, a decrease in the temperature of the earth's surface and lower atmosphere should follow, together with manifold direct and obscure distortions of the world's weather. A partial list of such disturbances recorded during the past two centuries of reliable observation, is conveniently tabulated in correlative form by Humphreys. We reprint it in Table 1, together with (for what it is worth as supporting information) Humphreys's list for the period of casual observation, beginning early in the Christian era (see Table 2).

IV. Some Salient Observations on Recent Weather

In addition to reducing sunlight intensity and temperature at the surface of the earth, the bomb should also change the pattern of precipitation. The latter, however, needs a little explaining.

During the entire fallout period, the lower atmosphere will contain quantities of the elevated ash. Like other dust and smoke, particles of ash from the bomb serve as condensation nuclei for raindrops and snow crystals. The radioactive character of the ash enhances this faculty, for the elementary particles continually emitted during radioactive disintegration ionize the molecules of the surrounding air — the products forming condensation nuclei for precipitation. In addition, the now cooler air becomes saturated with less water vapor, that is, suffers a diminution in its capacity to transport water.

These facts do not imply increased average precipitation (for the decreased sunlight means a lower rate of evaporation and, at equilibrium, less precipitation). They do, however, imply that precipitation should follow more closely on the heels of evaporation than normally. Since most evaporation takes place from large bodies of water, precipitation may not be able to penetrate its customary distance inland from the coasts.

This conjecture is given added substance by the recent discovery, from studies of tritium content of rainwater, that water vapor circulates in the atmosphere only about three weeks (or 500 hours) between evaporation and precipitation. Thus, a mean drift velocity of airborne water vapor of, say, 10 miles per hour would place the site of precipitation only about 5,000 miles from the source of evaporation, on the average. But this is only about one-fourth of the circumference of the earth (in the temperate zones) or, very roughly, the distance from the center of one of the two major bodies of water to the center of one of the two neighboring land masses.

Now, if the condensation nuclei and saturation considerations could conspire to shorten the three-week drift period drastically — say, by one-half — then water evaporated from the middle of an ocean, which would otherwise be precipitated over the center of a continent, might instead be dropped on the coast of that continent. Thus, coastal regions would be expected to receive heavier than normal precipitation, whereas areas remote from the coasts might be deprived of their normal supplies of water. Since weather

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[18] *Ibid.*, p. 604.

TABLE 1.[19]

Date	Nature of discrepancy	Probable cause
55-1756 ...	Cold	Kötlugia, Iceland, 1755, Oct. 17.
66-1767 ...	Cold	Hecla, Iceland, 1766, Apr. 15 to Sept. 7. Mayon, Luzon, 1766.
78-1779 ...	Warm	Maximum number (annual) of sun spots ever recorded and unusually short spot period. Can it be that the solar constant actually was noticeably greater than usual at this time?
84-1785-1786 ...	Cold	Asama, Japan, Aug. 2 to 5, 1783, most frightful eruption on record. Skaptar Jökull, Iceland, 1783, June 8 and 18. Vesuvius, Italy, 1785.
99	Cold	Fuego (?), Guatemala. (Uncertain.)
09	Cold	St. George (?), Azores, 1808. (Uncertain.) Etna (?), Sicily, 1809. (Uncertain.)
12-1813-1814-1815-1816 ...	Cold	Soufrière, St. Vincent, 1812, Apr. 30. Mayon, Luzon, 1814. Tomboro, Sumbawa, 1815, Apr. 7 to 12, very great.
31-1832 ...	Cold	Graham's Island, 1831, July 10 to early in August. Babujan Islands, 1831. Pichincha, Ecuador, 1831.
36-1837-1838 ...	Cold	Coseguina, Nicaragua, 1835, Jan. 20. Awatska, Kamchatka, 1837.
56-1857 ...	Cold	Cotopaxi (?), and others, 1855-1856. (Uncertain.)
72-1873 ...	Cold	Vesuvius, Italy, 1872, Apr. 23 to May 3. Merapi, Java, 1872, April.
75-1876 ...	Cold	Vatna Jökull, Iceland, 1875, Mar. 29 and during April.
84-1885-1886 ...	Cold	Krakatoa, Straits of Sunda, 1883, Aug. 27, greatest since 1783. Saint Augustin, Alaska, 1883, Oct. 6. Tarawera, New Zealand, 1886, June 10.
90-1891-1892 ...	Cold	Bogoslof, Aleutian Islands, 1890, February. Awoe, Great Sangir, 1892, June 7.
02-1903-1904 ...	Cold	Pelé, Martinique, 1902, May 8. Santâ Maria, Guatemala, 1902, Oct. 24. Colima, Mexico, 1903, February and March.
12-1913 ...	Cold	Katmai, Alaska, 1912, June 6.

the north temperate zone tends to drift from west to east, the centers f the drought regions might be expected to occur somewhat eastward of e centers of the northern continents.

If water vapor were customarily to drift many times around the earth efore returning to ground, a large percentage shortening of this period ight leave a long enough drift path so that precipitation could still occur

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[19] *Ibid.*, p. 615.

TABLE 2.[20]

Date of eruption	Volcano	Type of season, etc.
79, Aug. 24 ...	Vesuvius. (Destruction of Pompeii.)	About 80, severe drought for several years in middle Asia. (Accords with low temperature but signifies very little.) Very cold in England.
1631, Dec. 16 ...	Vesuvius. (Most violent since 79. Height of ash cloud, measured by Braccini, 48 kilometers.)	1632, Apr. 27, destructive snow in Transylvania (Siebenbürgen); May 17, frost in Saxony; hot dry summer in Italy; Oct. 4, very cold in France, 37 soldiers frozen between Montpellier and Baziers. 1633, severe winter; May 22, snow and severe cold in Transylvania.
1636, May 18 to winter	Hecla	1637, long, severe winter.
1680	Celebes	1681, severe drought and cold spring (Evelyn's Diary).
1693, Feb. 13 till August	Hecla	1694, hard, snowy winter in both Italy and Spain; May 17, all vineyards of Troyes destroyed by frost.
1694	Celebes	1695, long, severe and dry winter; cool summer.
1694	Amboyna	
1694, Nov. 20 till 1695, April ...	Gunong Api	
1707, May 20 to August	Vesuvius	1708, very mild winter; cold summer; Dec. 10 to 20, very heavy snow in France.
1707	Japanese volcano	1709 from Jan. 6, for a month and a half extraordinary severe cold in nearly all Europe; Adriatic Sea and Thames frozen; snow 10 feet deep in Spain and Portugal; 50 days frost in England from Dec. 25, 1708, till March 12, 1709; mild winter in Constantinople, but very severe in eastern North America; May 17, snow in Oedenburg; May 17 and 18, frost in Alsace; cool, rainy summer.
1707, May 25 and July 25	Santorin	
1721, May 11 till autumn	Kötlugia	1722, cool, wet year.

more or less at random over the land masses. However, such is not the case, and the highly probable much-shortened free drift path will place a premium for reception of precipitation on proximity to sources of evaporation.

A map of North America reveals that the Mississippi River basin is an ideal candidate for drought. Water vapor which might reach it from the east coast will have trouble crossing the Appalachian mountains, while the larger supply expected from the Pacific Ocean will find a more impassable obstacle in the array of mountains stretching from there across a third of the continent. The central Eurasian land mass (Russia) should be in similar circumstances, while western and central Europe (which are actually but a coastal region of Eurasia) should be plagued by too much precipitation.

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[20] *Ibid.*, p. 616.

It is now time to show that our theoretical deductions are being borne out in practice. Large bombs were exploded in a test series beginning on 1st March, 1954, and we shall examine the record beginning in April. Information for the first two months is taken from *Weather*, published under the auspices of the Royal Society, and from *Monthly Weather Review*, publication of the U.S. Weather Bureau.

APRIL — Britain had few warm days during the month (highest temperature reported: 67°F.), with frequent nocturnal frosts. Easter brought cold winds and heavy snowstorms to western and central Europe, blocking Alpine passes, with snow as far south as Rome and —16°F. recorded in the Aosta valley.

MAY — The month was a cool one in Britain, with 80°F. seen only twice, maxima frequently below 50°F., and total monthly sunlight below normal. Most of Europe reported inclement weather: flooding in southern France after five days of rain, heavy snowstorms over the Italian Alps, and heavy rains and low temperatures elsewhere in Italy. At Cape Town (then in its autumn) the severest storms of the century and the wettest May of record were noted. Unusual iceberg hazards in the western North Atlantic diverted liners. Whereas April had seen above-normal temperatures in the United States, May produced a marked reversal — 2° to 7°F. below normal. The first ten days brought up to 15 inches of snow around Lake Superior, and unusual cold to Minnesota. Stations in the Mississippi valley and in the southeastern states noted record low temperatures for the season.[21]

Nothing has been decisively proven yet, for spring and autumn are rarely times of record temperatures or other extreme weather. Also, the ash from the bomb requires time to drift far and wide, and form its global envelope. However, the record does show the beginning of deteriorating weather conditions — a late and short spring. With summer, the period of real inclemency began. *Weather* reports the following:

> JUNE — "[In Britain] there were many cool days and in most districts rainfall was in excess. There were few occasions with a temperature of 75°F., and the highest maximum, 77° . . . has been exceeded in every June in England and Wales since before 1920. There were many days when the maximum was below 60°F., while in eastern England and Scotland on a few days there were maxima of only 50°F. . . . [Virtually] no district had a sequence of sunny days while for the month sunshine was below the average in every part of the British Isles except the outer Hebrides. . . . From many parts of Europe and elsewhere there were reports of changeable weather in June. . . . [Heavy rains in central Europe and in Italy]. . . . At the end of the month the boundary river [Rio Grande] between Texas and Mexico reached a record flood height. . . ."[22]
>
> JULY — "The unseasonable weather of May and June continued throughout July. There were very few days when the temperature rose to normal values while in the first week there were maxima 10°F. below normal. On the nights of 6th and 7th temperature on the grass was below 32°F. in [several places in Britain]. For the first time for more than 25 years the highest maximum in the

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[21] "Weather of (Month)" sections, *Weather*, May and June, 1954. "The Weather and Circulation of (Month) 1954", *Monthly Weather Review*, April and May, 1954.

[22] *Weather*, July, 1954, p. 258.

> British Isles was below 80°F. in July. . . . For the combination of cool cloudy wet weather it was the poorest July for many years. Excessive rainfall was reported for many parts of the world, and snow down to levels of 1,000 ft. caused great floods in [the Danube basin]. In the Salzburg area twice the normal July rainfall fell in 24 hours, the Danube and its tributaries rose to record levels, mountain passes were blocked by snow, many lives were lost and immense damage caused. . . . At the end of the month the worst floods for 50 years developed from Bihar to eastern Assam, floods north of Teheran, and flooding along the Yangtse with the heaviest rainfall for 100 years. . . ."[23]
>
> AUGUST — "The cloudy cool wet weather of the two preceding months was continued during most of August [in Britain] and for the three months it has been the poorest summer for many years . . . it was persistently cool with the maxima frequently 10°F. below normal. . . . In some places less than 100 hours [of sunshine] was recorded. . . . Some towns in northern England had 25 rain days. . . . Very severe floods occurred from United Provinces (India) to Assam due to heavy rainfalls in the Himalayas, while the rivers Ganges, Kosi, and Brahmaputra destroyed villages and isolated large areas. The Yangtze reached a level 6 ft. higher than in the great floods of 1931. . . . Unseasonable weather occurred also in western and central Europe. At the end of the third week heavy rains occurred in Switzerland, Austria and northern Italy and mountain passes were blocked by snow and landslides. Thick snow was reported on the eastern Pyrenees on 24th. . . ."[24]

One notes that Britain is taking a real beating. This was to be expected, since she is all coastal region. The heavy overcast, which brings excessive precipitation, also intensifies the effect of the overhead ash on the sunlight by itself, reflecting a large portion back out into space (clouds normally reflect about 30 per cent of the incoming sunlight).

The reverse effect occurs in the centers of the continents. Here, with less than the usual amount of moisture-laden cloud cover arriving, one receives fewer cooling rains and, because the clouds are not reflecting their normal share of solar radiation into outer space, an increase in sunlight which may well overcome the screening effect of the stratospheric ash. All this makes for drought conditions. Once a state of drought arises, it tends to become self-perpetuating, as the cooling effect of evaporation of surface water is lost due to drying up of the sources of supply. Thus, there is no anomaly when, after reporting a cold, wet Europe (and other coastal regions), *Weather* appends the following statements:[25]

> JUNE — ". . . Yet Moscow on 27th with a maximum of 91.5°F. had its hottest day since 1879, and throughout the month it was hot in the U.S.S.R."
>
> JULY — ". . . In contrast excessively high temperatures were reported in the 2nd and 4th weeks from the northern and central U.S.A., while much of U.S.S.R. had hot weather."
>
> AUGUST — ". . . Yet in central U.S.A. a rain broke a drought which had caused enormous damage."

By August, the question was no longer problematic. *U.S. News And World Report* carried a lengthy article entitled "Europe Drips, Shivers",[26] and the European press was full of talk about the most unusual weather. A few press reports paint quite an impressive picture:

> London, Aug. 7 (AP) — "Britain's harvest has been set back two or three weeks by a 'sunless' summer, cool temperatures, and persistent rains. . . ."
>
> Bonn, Aug. 7 (Reuters) — "West German vacationers who insured their vacations against rain have been collecting heavily. . . ."

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[23] *Ibid.*, August, 1954, p. 246.
[24] *Ibid.*, September, 1954, p. 280.
[25] "Weather of (Month)" sections, *Weather*, July, August, September, 1954.
[26] *U.S. News and World Report*, 20th August, 1954, pp. 96-97.

> Paris, Aug. 9 (Reuters) — "Gales and rainstorms swept France to-day . . . The Riviera was the only corner of France that had summer sunshine."
>
> Copenhagen, Aug. 18 (AP) — "Bright sunshine returned to Denmark to-day after nine weeks of persistent rain, and an all-out effort was launched to save crops. . . ."
>
> Bern, Aug. 22 (Reuters) — "The famed St. Gotthard Pass . . . was blocked by a landslide to-day following 24 hours of torrential rain. The unseasonable deluge raised havoc from the upper Rhine Valley to Northern Italy."
>
> Paris, Aug. 27 (*N.Y. Times*) — "Parisians shivered to-day in the coldest Aug. 25 since the Weather Bureau went into operation in 1873. . . ."
>
> London, Aug. 27 (*N.Y. Times*) — ". . . If the weather experts are right, the city is due for its first fine week-end since June 19-20."
>
> Paris, Aug. 31 (*N.Y. Times*) — "Only one quarter of the normal amount of sunlight shone on Paris during June, July, and August, the Weather Bureau reported to-day."

Turning to North America, we find that New England had an exceedingly cool and wet summer, with truck crops doing very poorly and the city dwellers having a respite from the usually tyrannical sun. New York experienced the coolest 12th August ever recorded by its Weather Bureau, and its air-conditioning industry was badly disappointed by low sales due to the mild summer. On 29th August, the Boston Weather Bureau, commenting on an approaching hot spell, noted that ". . . it looks like a prolonged heat wave for the eastern states, which will be quite a change from the cool, showery weather we have had so far this summer". On 21st September, a New Haven newspaper remarked about a weather forecast: "If he [the weatherman] is right, that would make three consecutive days of sunshine . . . one of the longest strings of clear days in some months. Sometime during the weekend, however, the weather will return to its usual state — wet. . . . Summer's end won't be widely mourned. It was the worst summer in years. . . ."

The eastern maritime provinces of Canada fared at least as badly. Crops matured very slowly; rain ruined much fodder; and day followed sunless day from Montreal to the sea. As an example of the concomitant hardship, a Toronto financial newspaper carried, on 18th September, an article entitled "Large Catch But No Sunshine Newfoundland's Fish Problem", noting that "one fisherman at Gate's Cove said he had carefully jotted down the number of fine-weather days this year. His total: seven". From the scanty available reports, the Pacific coast of the continent has also been somewhat cool and moist. The northern rim of this region, the prairie lands of central Canada included, have definitely been too cold and too wet, as we shall see when we discuss the agricultural situation in section VII.

It appears that the southern and central United States have suffered a drought of unprecedented dimensions. A few newspaper cuttings will tell the story:

> Washington, Aug. 2 (*N.Y. Times*) — "President Eisenhower designated 102 counties in Missouri and Oklahoma to-day as drought disaster areas . . . Texas, Colorado, New Mexico and Wyoming previously have been designated [thusly] . . . Secretary Benson said the drought area was widening steadily. . . ."
>
> Washington, Aug. 10 (AP) — "Searing July temperatures and drought in major farming areas sliced an estimated 15 per cent off this year's corn crop and reduced the aggregate volume of all crops 5 per cent below prospects of a month earlier, the Department of Agriculture reported to-day. . . ."
>
> Des Moines, Aug. 14 (*N.Y. Times*) — "The drought that has held most of the

> Missouri Basin in a fiery grip this summer was partly broken early this week by rains. . . . In many sections this moisture came too late to prevent heavy losses. . . ."
> Washington, Sept. 14 (UP) — "The Agriculture Department to-day added ninety-three counties in six states to its list of drought disaster areas . . . Arkansas, Colorado, Missouri, Oklahoma, Texas, and Wyoming. . . ."
> Washington, Sept. 27 (U.S. Dept. of Commerce *Weekly Weather and Crop Bulletin*) — "The summer of 1954 . . . has been one of the hottest and driest on record from Kansas, Oklahoma, and Texas to the Atlantic coast. Little Rock, Ark., a good example of the persistent heat . . . had . . . a total of 43 days with maximum temperatures of 100° [F.] or over, greatly exceeding the previous record of 23 in 1943. Also, this station received only 23 per cent of its normal summer rainfall. Hot dry weather continued through September in most of this area. . . ."

But for the official silence regarding details of conditions in Russia, similar stories could probably be told about central Eurasia.

From Japan comes news that, as expected, it has been a cool summer. The heat and light needed to produce mulberry leaves (food for silkworms) has been lacking, and it will be a bad year for Japanese silk. Dr. H. Arakawa, of the Meteorological Research Institute, notes in *Asahi,* Tokyo newspaper, on 29th July that the weather of this summer has been much like that of 170 years ago. Following the 1783 eruption of Mt. Asama, the summer of 1784 brought a pattern of drought and wet-cold areas almost identical with that of 1954.

V. The Year of Floods

1954 has been a banner year for floods. These have been caused by the exceptionally vigorous precipitation along the fringes of the great land masses — abetted by the greater percentage runoff produced by the decreased average rate of evaporation and by the late and sudden melting of winter snows. The extensive coastal regions of Eurasia — from western Europe, through the middle east, to China — have suffered a remarkable collective catastrophe, which is all the greater because this belt of land sustains the majority of the world's population.

The story of the July rampage of the Danube is doubtless familiar to all. In June, the European press began noting the precursor heavy precipitation and late-melting snow. Recorded here are two press descriptions of the flood:

> Vienna, July 10 (AP) — "Central Europe's worst floods in fifty years swept behind the Iron Curtain to-day, pouring into . . . Prague. . . . Meanwhile, raging waters of the wreckage-filled Danube poured into the Austrian steel city of Linz, as a great inland sea built up in the heart of Germany's and Austria's richest farmland. Hundreds of German and Austrian villages were under water, many of them deserted. . . . A great expanse of water extends over the banks of the Danube along a 300-mile stretch from Regenburg . . . to Vienna. . . . The normally peaceful Danube is a churning brown torrent, carrying debris from flooded farms, battered bridges, power stations and homes. The bodies of hundreds of cattle also bobbed in the stream . . . tributaries like the Inn, the Isar, the Enns and the Traun have spilled their banks, crashed through dams and caused incalculable damage . . . there is danger that new rain and melting snows may cause them to rise again. . . ."
> Vienna, July 16 (AP) — "More than 40,000 Hungarians have been evacuated from villages along the banks of the raging Danube River, Budapest radio said to-day. The Communist report indicated the Danube floods, which earlier this week forced 70,000 to flee their homes in Germany and Austria, were equally disastrous behind the Iron Curtain. . . ."

The flood of the Danube furnishes critical support for our theory. The singular attribute of this river is its lovely tranquillity. It is navigable for the greater part of its length. It has stably supported a great agricultural region for centuries. In its basin, the rapacity of colonial and competitive farming, mining, and logging practices (as known in India and America, respectively) — which denude the countryside of vegetation, ruin the topsoil, and lower the water table, thereby inviting severe extremes of drought and flood — are not to be found. Considerable research has yielded no mention of a serious Danubian flood. The most violent elemental aspect of the Danube to which we could find reference is the kosava, "curse of the Danube basin, especially in winter, and . . . well named 'the mower'. It is a cold penetrating wind from the northeast."[27]

In August, the entire watershed which swings in a great arc from Asia Minor, through the Himalayas, and then northward, seemed to burst into action. On 3rd August, a *New York Times* dispatch listed 40,000 homeless in a "disastrous" flood in Iran. On 1st and 15th August, Reuters noted nearly 1,000 deaths from "one of Nepal's worst floods of this century". On 12th August, Reuters reported that the Namchung river had been in flood since July, "caused by heavy rains over the whole of Tibet". And in the more populous countries:

PAKISTAN: . . .

Dacca, Aug. 17 (*N.Y. Times*) — ". . . swirling waters of the Brahmaputra River and its tributaries washed 15,000,000 persons from their straw shacks and mudhuts in northern and central sections of this [East Pakistan] jute and rice land. . . . Government engineers who described the two-week-long flood as the 'worst in the recorded history of the area' said the Zuriganga had reached twenty-two-and-a-half feet last week. . . . [Public health officials] expressed fear of widespread starvation following extensive losses of food crops and cattle in the densely populated province. . . ."

Dacca, Aug. 19 (*N.Y. Times*) — "Millions of victims of the East Pakistan flood were threatened with greater disaster as the waters of the Brahmaputra River rose to-day. . . . Engineers said the rise . . . was expected to wash out hundreds of miles of single-line rail communications that had been restored last week after a drop in the water level. . . ."

Karachi, Sept. 8 (*N.Y. Times*) — "Prime Minister Mohammed Ali said to-day that the total population of 42,000,000 in East Pakistan had been affected by the eight-week-old flood. The flood has swept through 36,000 square miles. . . ."

Lahore, Sept. 24 (Reuters) — ". . . flash floods caused by a freak rainstorm [began] last night. A total of 16.32 inches of rain had fallen after seventeen and a half hours of continuous downpour. . . ."

INDIA: . . .

Calcutta, Sept. 3 (Reuters) — "Epidemics of cholera and hoof and mouth disease crept over northeast India to-day in the wake of floods that had taken 144 lives and destroyed the homes of 50,000 villagers. Cattle are "dying in thousands' in Bihar state. . . ."

New Delhi, Sept. 11 (Reuters) — "The Indian government will meet the flood situation in northern and northeastern India on a 'war footing'. . . . Millions are homeless or isolated, thousands are starving and hundreds are feared dead in the greatest floods to ravage northern India in years."

CHINA: . . .

Tokyo, Aug. 1 (AP) — "More than a million peasants and soldiers in Red China are battling to hold back the Yangtze and Hwai Rivers after 'the heaviest rainfall in a hundred years', the Peiping radio said to-day. . . . Both the Yangtze and Hwai have risen to record crests. . . ."

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[27] Lovett Fielding Edwards, *Danube Stream*, London, Frederick Muller, 1940, p. 197.

> Tokyo, Aug. 9 (AP) — "The Peiping radio conceded to-day that 6 per cent of Red China's agricultural land had been flooded, hitting the rice crop hard and creating a 'serious menace' to production. . . . A member of the Japanese Diet, who flew over the Yangtze . . . said the rivers had created an inland sea the size of the northern island of Hokkaido which is about as large as Indiana. . . ."
>
> Hong Kong, Aug. 12 (China Union Press) — "There is an abnormal amount of rain in Kwangsi this year. . . . As a result the rivers are swollen. . . . In spite of the effort put up by the Communists, huge losses are sustained. It is estimated that about 3,000,000 *mow* of paddy (early crop) is submerged in water and ruined. (The total area of paddy fields in Kwangsi is 12,000,000 *mow*.) Other losses include about 8,000,000 civilian houses and innumerable human lives and cattle."
>
> Hong Kong, Sept. 29 (*N.Y. Times*) — "According to a delayed dispatch from Peiping, China's . . . floods . . . inundated 41,665 square miles. . . . The Minister [of the Interior] said more than 10,000,000 persons had to be evacuated from the flood stricken areas of Hupeh, Hunan, and Hanhwei. . . ."

It will not suffice to argue that the above areas of the Orient are always being flooded. The floods of 1954 are not ordinary — they are record floods. Even the traditionally flooding Nile River had this obvious character this year:

> Cairo, Sept. 17 (UP) — "Floodwaters of the River Nile reached a 60-year record level of 47 feet to-day. . . . Public Works Minister Ahmed Sharabassi quintupled levee-repair forces, warning that the protective embankments may erode away if the record floods continue for any length of time."

Nor has America been entirely without high water. While the mid-continental drought has been the major phenomenon of the season, Mexico and Honduras have reported floods, and New England and eastern Canada have had quite swollen streams, at times, resulting in inundation of nearby lowlands. It is interesting to reflect upon the late June flooding of the Rio Grande. This is, normally, but a trickle of water, across which illegal Mexican immigrants by the thousands wade into the United States. It not infrequently runs completely dry. Late June should not be an especially wet period for the Rio Grande. In fact, it is a fairly general rule that summer is not the flooding season:

> "It is no accident that great floods occur only in winter or spring. . . . There is in the active vegetation of the warm season an effective interceptor of rain, a mechanical hindrance to run-off, and a rapid user of ground water. Hardwoods in Wisconsin when in leaf intercepted 25 per cent of the rainfall but when dormant only 16 per cent; but this difference of 9 per cent of the rainfall is but a small part of the total change of run-off from summer to winter for the same rainfalls. Besides the several effects of vegetation, evaporation from the ground is greater in summer. . . ."[28]

VI. Some Comments on Secondary Effects

A more thorough study of the interference by the bomb with meteorological processes would doubtless discover cause for weather abnormalities on ever more subtle levels. We shall discuss here a few of these secondary effects — those which arise from disturbances of horizontal winds and vertical convection.

The differential regional heating of the earth leaves the polar areas colder than the tropics. This temperature difference, known to meteorologists as the interzonal temperature gradient, causes all major atmospheric circulation. Because sunlight passes more obliquely, on the average, through the envelope of overhead ash as one travels from the equator toward the poles, Humphreys observes that the polar regions should be more effectively screened from the sun's rays by elevated ash than should the zones nearer the equator. "Hence, an increase of such dust would steepen the interzonal temperature gradients, strengthen the winds, and make heavier the rain and snowfall. . . ."[29]

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[28] Charles F. Brooks and Alfred H. Thiessen, "The Meteorology of Great Floods in the Eastern United States", *Annual Report of the Smithsonian Institution*, 1938, p. 330.

Because the increased interzonal winds would bring some precipitation into the temperate zones which might otherwise have fallen on the polar regions, one might expect an intensification of precipitation on the polar sides of the great land masses. This may explain, for example, why central Canada had a wet summer despite its being more inland than the Gulf of Mexico coast of the United States, which was essentially part of the Mississippi basin drought area.

The strengthened interzonal winds are turned intra-zonal (by the earth's rotation) after entering the temperate zones. Therefore, the strength of horizontal winds in general is expected to be increased by the bomb. This is of great practical importance, for since storms involve strong winds, a given percentage increase in average wind velocities might well mean the same percentage increase in the intensity of storms and a comparable increase in material damage and human casualties.

The bomb could also cause local perturbations of the normal natural balance by increasing vertical convection. This is because the elevated ash cannot distribute itself about the stratosphere with perfect uniformity. Normal sunlight may shine through an area containing virtually no dust, while a mile — or 50 or 1,000 miles — away, an exceptionally dense patch of ash may drastically reduce temperatures below. This resulting unevenness of heating will cause local increases in convection and turbulence. Spottiness in weather conditions and possibly even local wet/dry cycles may follow. One senses that an unbalanced Nature must have her revenge. For example:

> London, Aug. 25 (*N.Y. Times*) — "Residents of Manchester . . . were startled today . . . [by] a plea . . . to conserve water. As the city had nearly 9 inches of water since July 14 . . . the residents thought it was a case of carrying coals to Newcastle. A waterworks official acknowledged the request seemed absurd. . . . However, he recalled that a similar wet spell in summer of 1947 had been followed by a drought that had left reservoirs almost empty by the middle of November. . . ."

The reference to the wet/dry cycle of 1947 may not be as unrelated to the bomb as one might think. For ordinary fission (atomic) bombs were being exploded during the two preceding years, and even these can throw up some ash — especially into the troposphere, where it would be effective in upsetting the precipitation balance.

Further evidence of extensive distribution of atmospheric ash from small nuclear bombs is contained in a letter to *Weather*:

> "Did anyone notice an increase in the Purple Light during the Autumn of 1953? It was frequent and quite bright, notably during the fine sunsets of 6th to 10th September. I am wondering whether the many atomic explosions have any connection with the Light. The Purple Light is said to be caused by fine

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[29] Humphreys, *op. cit.*, p. 600.

> volcanic dusts suspended at great heights in the atmosphere. It could be that the clouds of atomic explosions (which have reached heights varying from 15,000 to 40,000 ft.) have carried dust into the lower stratosphere in large enough amounts to cause the Light.
>
> J. Pill
>
> Bristol."[30]

That Mr. Pill has very likely hit upon the truth is seen by turning to the *Compendium of Meteorology* (compiled by the American Meteorological Society):

> "The investigation of twilight phenomena is closely connected with the study of the optical properties of the upper atmosphere . . . and, thus, indirectly with the study of its density and dust content. . . . At approximately 2° sun's depression, the *purple light* appears as a purplish area above the solar point in the western sky. . . . Secular variations of intense purple lights have been observed associated with dust produced by volcanic eruptions."[31]

Mr. Pill's observation may have been related to the (unknown to him) American tests of pilot-model hydrogen bombs in spring, 1951, and in November, 1952. However, the energy release required to elevate consequential quantities of ash appears now to be low enough so that the harmlessness of bombs of less than megaton size is questionable. His discovery both reinforces our calculations of section II and makes us wonder what other adverse weather conditions since 1945 might have been due to nuclear explosions.

In a letter to *The Argus* (Cape Town, South Africa, newspaper) on 13th August, Charles B. Mussared, a former engineer-officer in the Merchant Navy, commented upon "the growing belief among navigating officers that the freak storms we had experienced [since the war] were due to the unbalance of the elements reacting from the atom bomb explosions". Seasoned seamen are perhaps the most capable people in empirical detection of altered weather conditions. Their suggested causal connection is in this instance quite possibly correct.

In conclusion, we should like to undertake a somewhat detailed examination of one secondary meteorological consequence of the bomb. In *Tornadoes of the United States,* we read:

> "[Tornadoes] result in the Northern Hemisphere when comparatively cold, dry air, moving from a westerly direction with a steep lapse rate,[32] overruns abnormally warm, moist air moving from the south or southwest. . . . Warm air, being lighter than cold air, rises through the latter, in extreme cases in great uprushes. Cooling of the moist air as it rises results in condensation of part of its water vapor, which in turn releases latent heat which adds to and maintains the energy of the storm. . . .
>
> "The topography of the region east of the Rockies in the United States is more favorable for these conditions than that in any other part of the world. As a result, tornadoes are more numerous and violent here than anywhere else. There are no mountain barriers to modify the warm, moist air moving from the Gulf of Mexico or the Caribbean Sea, and Polar Maritime air from the Pacific must cross the Rockies to reach the interior valleys. As it descends the east slope of the mountains, it is warmed by compression in its lower levels, becomes dry, and often develops a steep lapse rate."[33]

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[30] *Weather,* August, 1954, p. 256.

[31] Hans Neuberger, "General Meteorological Optics", *Compendium of Meteorology,* 1951, pp. 72-73.

[32] *Lapse rate* is the technical term for negative vertical temperature gradient, i.e. rate of decrease of temperature with distance upward.

[33] Snowden D. Flora, *Tornadoes of the United States,* Norman, University of Oklahoma Press, 1953, pp. 20-21.

Immediately after a nuclear explosion in Nevada or in the Pacific, ash drifting eastward with the weather could shield the colder air advancing over the Rockies without affecting the warmer air moving in from the Gulf of Mexico, thus increasing the temperature difference between the two air masses and enhancing the possibilities for tornado occurrence. The warm air, as it rushes upward through the colder, would encounter the condensation-encouraging radioactive ash, and would therefore more willingly precipitate and add its latent energy of condensation to the fury of the storm. It may be that the succession of tornadoes which marched across the United States, from west to east, following the spring, 1953, atomic bomb tests in Nevada, was the product of such a setting of maximal tornado conditions by the bomb. The United States government seems to have chosen test sites which are ideally located for the purpose of loosing tornadoes upon its population.

VII. The Effect on Agriculture

An overall assessment of recent crop reports leaves one sobered indeed. Beginning in North America, where vast quantities of basic field crops are produced, we find that the central United States drought area has essentially covered the entire cotton belt and part of the wheat belt. The rainy regions have included most of the North American wheat-growing areas. The fate of these two great staple crops will give some idea of the agricultural destruction which has taken place on that continent. (This does not imply that corn, oats, potatoes and truck crops have fared well.)

COTTON . . .

> Washington, Sept. 8 (AP) — "The Department of Agriculture reported to-day that drought and extremely hot weather in August cut this year's cotton prospects 7 per cent. . . ."
>
> New York, Sept. 20 (*Wall Street Journal*) — "The growing season for major United States crops is drawing to a close. . . . The most significant change [yet to come in crop estimates], experts believe, may be in cotton. Private reports stress further damage to the crop. . . . The October 1 Government forecast, which will be published on October 8, is expected to show a further drop from the September 1 report of 11,832,000 bales. As of August 1, the cotton crop was estimated at 12,680,000 bales. . . ."

WHEAT . . .

> Chicago, Sept. 19 (*N.Y. Times*) — ". . . The official September Canadian estimate indicated a yield of 378,000,000 bushels of wheat, compared with 614,000,000 bushels raised in 1953. Further downward adjustment in American spring wheat estimates is also likely. In any case, the North American crop will be 400,000,000 bushels or more less than in 1953. . . ."
>
> Chicago, Sept. 24 (*N.Y. Times*) — ". . . On the basis of the Free Press estimate, the North American wheat crop this year will be 500,000,000 bushels less than last year. . . ."
>
> Edmonton, Oct. 2 (AP) — "A white blanket of snow spread gloom to-day throughout northern Alberta, where half the 1954 grain crop is still uncut. The [snow] . . . was spreading rapidly into southern Alberta and east into Saskatchewan. . . ."

The quality of the yield will also be lowered. Much of the cotton harvested is from prematurely opened and partially shed bolls. It is thus of inferior texture and shorter staple. A good protein/carbohydrate ratio in grains requires a good balance of sunlight, water, and other elements of plant nutrition. Excessive precipitation lowers this ratio. Thus, very little hard, high-protein wheat has been harvested this year. According to the

Financial Post of Toronto, 18th September, "Last year 72 per cent of western wheat graded in the three top grades. Information so far indicates less than 20 per cent will fall in these grades". Much will be fit only for livestock feed.

The final statistics on the harvest will not reveal that much of the grain which was harvested matured very late because of the reduced sunlight, and that a greater agricultural failure was narrowly missed. The Canadian oat crop did not meet the deadline, and some of the late wheat will be frost-bitten, chaffy, and of poor milling quality. Nor will these figures tell of the vast extra labor that was expended to save crops from ruin, as in Maine, where the potato farmers had to bring heavy equipment for treating blight and for harvesting into soggy fields.

Europe has been harder hit than has North America. From London, the *New York Times* reported on 27th August:

> "Dr. Cyril Garbett, Archbishop of York . . . called to-day for prayers for good weather to save Britain's harvest from destruction. . . . The farmers' difficulties have been caused by one of the worst spells of weather in Britain's recorded meteorological history . . . the farmers say they will need at least a week of brilliant sunshine to dry out the fields and three to four weeks of good weather to avert serious crop losses. . . . One difficulty faced by the farmers has been their inability to move their heavy harvesting machinery onto their sodden fields. . . . Ripening also has been uneven and the heavy rains have caused the spread of mildew and disease. Even if the weather stays fair, many farmers will have to telescope their grain and root harvests, a difficult task with the labor available. It is estimated that less than one-tenth of the grain harvest has been brought in and the chances of salvaging damaged wheat and barley are not considered good. . . ."

On 17th September, the London correspondent of the *Financial Times* of Toronto remarked:

> "The harvest is in a bad shape. . . . I have just returned from a holiday in an area which for Britain can be described as a grain belt. There I saw wheat fields flattened after torrential rains and, where the grain was still standing, it was growing out in the stock. Thousands of acres of hay are spoiling and in some districts harvesting has still to begin . . . one farmer told me that he doubted whether one-tenth of the wheat acreage had been brought in. . . . The pea crop has been affected by mildew and crops ready to pick three weeks ago have still not been harvested. Indeed some growers have given up the ghost and ploughed their crops in. . . ."

A *New York Times* dispatch from Munich, dated 11th August, indicates the distressed condition of western and central Europe:

> "Unless West Central Europe gets a few hot sunny days very soon this region is going to suffer its greatest post-war crop failure. Just at the critical stage of the wheat harvest a wave of cold wet weather flattened the grain. . . . What is worse, farmers say the grain is starting to sprout. . . . According to local press reports, the situation is much the same in the French wheat belt and in northern Germany. The entire countryside is in a state of alarm. Men, women and children are working in the fields, trying desperately to save what they can. . . . Exhausted farm workers can be seen lying along the roadside. Many are working fifteen or sixteen hours daily. . . . It is a cheerless harvest. . . ."

And on 9th September, the Associated Press bureau in Bonn began submitting the final returns:

> "One-fourth of West Germany's crops were destroyed by floods and bad weather this year, Bernhard Bauknecht, chairman of the Parliamentary Agricultural Committee, said to-day. Damage totalled about 1,000,000,000 marks ($238,000,000), he told the committee. The official said the harvest was the worst in twenty-eight years and the situation would have to be treated as a national disaster. . . ."

Other European nations have fared about as badly. Jugoslavia and East Germany have reported poor harvests and food crises. Russia and her east European colonies have been less candid. However, Russia has reported delays in harvesting and that this year's crop has been adversely affected by drought conditions. (*New York Times,* dispatches dated 20th September and 30th September.) The harvest, now completed, is described as "medium".

In India, Pakistan, and China, the great floods of the past summer have taken an unimaginable toll. Crops near harvesting have been ruined; much livestock has been lost; and the use of much labor (diverted to other tasks) and of much inundated land has been denied the population at the most needed season of the year. A small part of the casualty list for Pakistan alone reads: over 1,000,000 bales of jute lost; 10,000 tons of rice and wheat lost; 80,000,000 pounds of cotton (one-fourth of the crop) destroyed — all due to flooding alone.

To the flood damage must be added decreased yields arising from the same fundamental weather disturbances as have afflicted North America and Europe. The basic grain of this region — rice — is probably more adversely affected by too-cool weather than are other grain crops. This is because,

> "Rice is a tropical cereal and thrives best in regions of great heat. . . . The great part of the crop is cultivated where the mean summer temperature is over 75° to 77° [F.], although certain varieties are grown in Japan, where the average is not over 70°. The maximum temperature limits are unknown, but the minimum limits are of great importance. At temperatures lower than 46° to 50°, the tender leaves are partially arrested in growth, and the greener parts of the stem turn yellow."[34]

In addition, rice has the lowest protein content of all the cereals. As already mentioned in the case of wheat, a wet year reduces the protein/carbohydrate ratio. This, in an area where little meat is available and where fish may now be eaten only with trepidation (due to the radioactive pollution of the Pacific Ocean), further unbalances an already one-sided diet. Undernourishment and low disease resistance must therefore be abetted.

It is a general principle of agronomy that for each crop there are certain optimum conditions of growth, under which the most desirable balance of quantity and quality of food are yielded. Over the years, farmers learn where to locate a given crop, or what crop to grow in a given locality, in order to adjust crops to climatic conditions. Since any shift in meteorological averages must move growth conditions away from the optimal, it goes without saying that the bomb will reduce the quality of the harvest in nearly every possible way.

We have already mentioned the effect on the protein/carbohydrate ratio. More obvious is the interference with the process of photosynthesis, which depends in large part on sunlight intensity. Vitamin content may also be affected, and the change in the vitamin A and D content of forage crops will show up in the quality of milk.[35] Investigation could undoubtedly unearth more deleterious effects. We shall mention only one, which, because of its seriousness, merits close attention:

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[34] J. Warren Smith, *Agricultural Meteorology, New York,* Macmillan, 1920, p. 179.

[35] See, e.g. A. W. Pierce, "Some Problems of Vitamin Deficiencies of Animals in Australia Dependent on Climatic Factors", *Proceedings,* Specialist Conference on Plant and Animal Nutrition in Relation to Soil and Climatic Factors (1949), Australia, 1951, pp. 352-357.

> Tokyo, May 13 (Kyodo) — "Hereditary studies on the effects of the Nagasaki A-bomb on rice growth have revealed that atomic radiation definitely stunts the growth of rice, in some cases to less than half of normal, according to *Tokyo Shimbun*. Studies of about 2.8 kilograms of rice, which was gathered at points from 600 to 3,000 meters from the center of the Nagasaki atom blast, have been carried on since 1946 under the direction of Dr. Koochi Murachi, authority on atomic radiation of St. Paul's University in Tokyo, at the Agriculture Forestry Ministry's Research Institute in Kanagawa. Results revealed that the rate of ripening of the atom-bombed rice is from 40 to 60 per cent normal in most cases, with comparatively few instances in which the rate was below 40 per cent normal; and the length of the stalk of the atom-bombed rice was about 30 to 40 centimeters, in contrast to the 85-90 centimeters of a normal plant. The leaf also was irregular, with some leaves wide and others narrow, while the rice grains were short, of poor quality, and growing closely together, according to the study."

We may thus be assured that the ash which is washed out of the lower atmosphere will leave, as its legacy, inferior seed for the following year's planting.

It is true that an altered pattern of weather will not have totally negative results. We are told that 1954 has been a good year for some German wine grapes, and that (because of an excellent supply of water-swollen green grass) Europe will have a fine crop of cattle this year. However, it is more fundamentally true that successful agriculture must be based upon predictable weather.

Even the petty annoyances — such as the ruination of the English honey take and the prospect, because of the poor malt and barley harvest, of less good Scotch whiskey — are deplorable and, we should bear in mind, mean economic tragedy to many whose livelihoods depend upon a highly developed (if artificial) division of labor.

It is one thing for a wealthy North America to have a poor harvest. There, numerous official and press sources have noted that the pressure will be relieved on the mounting agricultural surpluses, which have had to be stored until rotting solved the problem. For Europe the coming year is likely to be one of tightened belts, but doubtless nearly all will survive there also. In the Far East, however, great numbers of people are chronically underfed, and the possibility of the bomb's destroying their tenuous hold on life must not be taken lightly. After the eruption of Mt. Asama in 1783, Japan had a bad rice crop failure and the worst famine in her history, in which about 400,000 people died of starvation in the northeast section of the country alone. One should note that masses of Asians live only a step ahead of starvation. Bringing about a general crop failure, or even destroying only the rice crop (the staple of their diet) means, perhaps, sentencing millions of people to death.

VIII. The Reaction of Press and Science

It is a social tragedy of magnitude that the non-Japanese press and radio have not alerted us to the threat to human existence posed by the bomb. Attempts by Japanese to get information to the outside world have, in general, been met by the press with silence. When one can find, in any number of the average American newspapers, a dozen articles concerning the blessings of the United States' nuclear weapons program, such negligence hardly seems the result of chance. Upon occasion, our newsmen have seen fit to carry stories on Japan. But they have apparently been as much concerned with deprecating the competence of the Japanese scientists or with modifying the content of the dispatches as with their legitimate task of conscientious dissemination of news.

An example of lamentable flippancy is a 20th July dispatch from Hiroshima appearing in the English-language Tokyo newspaper *Nippon Times*. There, an Associated Press staff writer made light of the ability of Japanese scientists to conduct meaningful Geiger counter tests, under the title, "Vegetables Radioactive? Yes or No — Take Choice".

The following news item furnishes an example of omission and distortion of fact:

> Tokyo, [no date] (AP) — "A Japanese scientist is blaming the H-bomb tests last spring for still another development — chilly summer weather. Dr. Hidetoshi Arakawa said that because of the lower temperatures a record low rice crop is in prospect this year."

First of all, Dr. Arakawa has levelled a serious charge. If there is any merit to it whatsoever, one should like to know in sufficient detail the facts and the reasoning upon which the charge is based. One might also be more impressed if Dr. Arakawa's credentials were mentioned.[36] Added to this is the Associated Press' opinion that Dr. Arakawa is merely "blaming" the bomb for "still another development". One gets the impression that Dr. Arakawa is being presented as a crackpot, or as just a U.S.-hater. It is our good fortune to have seen a fuller account of his opinions, in which his statement is discussed in sufficient detail to convey accurately the substance of what was said. Since it obviously originated from the same material as the A.P. dispatch, there is little doubt that the A.P. had access to all the information which a conscientious and candid press might require:

> Tokyo, July 29 (Kyodo) — "Leftist Socialist Party members were told by Dr. Hidetoshi Arakawa that the poor rice crop in Japan this year could be traced to the U.S. Bikini H-bombs. The sun's radiation, Dr. Arakawa said, has been weakened considerably as a result of ashes blown high into the stratosphere by the recent thermonuclear blasts. He said past records show that the temperature of the earth declined through weakening of the sun's radiation after the great Krakatoa volcanic eruption in 1883. Similar conditions followed the eruptions of the Santa Maria volcano in Central America in 1902 and of Katmai volcano in Alaska in 1913, Dr. Arakawa said. In all three cases, he said, dust from the explosions rose to a height of over 10,000 meters into the stratosphere, enveloping the earth and obstructing the sun's rays. Dr. Arakawa said after Mt. Asama, on the borders of Nagano and Gumma prefectures, erupted violently in 1783, Japan had its worst rice harvest. He added that some 400,000 persons were known to have died in the Tohoku area alone in that year as a result of abnormally cool rain from the beginning of spring to the end of summer. Arakawa said that usually after major eruptions temperatures continue to be low for several years, resulting in crops suffering from frost. He expressed belief that the recent tests at Bikini have brought on the same effects as the volcanic eruptions. He said it would be a bad thing if the Soviets held their H-bomb tests in August, as reportedly planned. If the tests must be held, it is hoped they will be carried out one or two months after the rice crop in Japan is harvested in autumn."

The *New York Times*, which informs its readers on page one of every number that it presents "all the news that's fit to print", did not see fit to print even the much-condensed A.P. dispatch. Throughout the spring and summer, this foremost American newspaper has behaved much more like a branch of the State Department or of the Atomic Energy Commission than like a responsible reporting agency. It apparently subscribes to the official theory concerning American thermonuclear explosions — that the bomb (aside from an occasional fisherman regrettably dusted) has an absolutely null effect on the well-being of the species. It has accordingly maintained a virtual black-out on news from Japan, where a public and a scientific community aroused by terrible experience have brought to light much meaningful information, of which the entire world should be apprised.

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[36] He is one of the world's more experienced and capable meteorologists, and is director of the Meteorological Research Institute's weather forecasting research section.

The coverage of a recent conference of the World Meteorological Organization in Switzerland illustrates the quality of the *New York Times*' reporting. On 25th August this paper printed a dispatch from Geneva under the innocuous title "World Weather Could Be Worse", which is reprinted here in full:

> "The wise weather men are not able to affirm that there is anything definitely queer about the way the elements are behaving this year. But they concede the weather has been particularly bad. Experts of the World Meteorological Organization, which is holding an executive committee meeting here, read the papers like anyone else, and the papers are full of stories of floods and of more rain to come. From China across the Eurasian area to Switzerland, there seems to be too much water in the wrong places. No sooner did the Danube creep back into its banks than the Rhine and its tributaries began to overflow. The roads across half the passes in the Alps are wholly or partly washed out. "If you had lived, say, seventy years," one cautious meteorologist said in response to efforts to get him to go out on a limb, as it were, on the weather, "you might say this was unprecedented. On the other hand, if you had lived, say, 500 years, you might say that you had seen lots of worse summers." The fact is that nobody knows much in detail about the weather before 1850. The longest continuous records have been kept in the Netherlands, and they are only a little more than 100 years old. The League of Red Cross Societies has fewer doubts than the scientists. The league has received more calls for help in flood disasters within the last few weeks than in any comparable period in its thirty-five-year history. It is actively engaged in East Germany, Hungary, Pakistan, India, and Austria."

The author freely and disarmingly admits that we have had an uncommon spell of bad weather. He then, however, offers us the Pollyanna-like wisdom that if we live long enough we shall see weather as inclement as we please, and advises us to grin and bear it. Concerning the actual proceedings of the conference, he tells us nothing. Had he looked into this more germane aspect of his subject material, we might have been told that "the World Meteorological Organization had decided to conduct a scientific investigation into the effects of nuclear explosions on the weather". This information has come to us in a Kyodo dispatch from Tokyo, dated 15th September. It appears that the decision to investigate resulted from urgings by Japanese meteorologists. The Kyodo release continues:

> "The Japan Meteorological Society adopted a statement at its 1954 convention held in May declaring that:
>
> 1 — Radioactive particles blown up into the stratosphere by H-bomb tests are being carried around the world in the atmosphere.
>
> 2 — Since contamination of the atmosphere continues over a long period, weather conditions are abnormally affected.
>
> 3 — From a meteorological point of view, atomic tests and the manufacture and use of atomic arms should be banned immediately and efforts should be made for international control and peaceful utilization of atomic energy.
>
> 4 — The results of all investigations and research on contamination and other weather phenomena arising from the H-bomb tests should be made public.

> Besides sending the statement to WMO, appeals were also made to meteorological organs in the United States, Britain and other countries. . . . WMO is believed to have decided to embark on a full-scale investigation of the matter based on the statement sent by the Japanese organ. . . ."

Since 25th August, to our knowledge, the *New York Times* has not seen "fit to print" any more on the conference.

It is a tragedy compounded that the press has not alone been remiss. Otherwise competent scientists — outside of Japan — have failed to alert the public to the realities of the bomb, and some have even ridiculed the notion that the bomb might influence the weather. For example, the 15th September Kyodo dispatch notes that ". . . the investigation would settle the difference in views now existing between Japan and America on the matter. Whereas Japanese experts have been claiming that the nuclear tests affect the weather, views to the contrary are being expressed by the American side".

Any number of physicists and meteorologists have made the pronouncement: The energy release of any nuclear bomb is very small compared with the kinetic energy and the latent heat of state of extended air masses. Therefore, the bomb — especially when exploded in the vast emptiness of the Pacific Ocean — could not possibly cause a noticeable effect on world weather conditions. Just before the spring test series, the noted physicist O. R. Frisch remarked that:

> "Against the background of Nature, atomic weapons are small. An average local thunderstorm releases as much energy as a plutonium bomb; a hurricane or an earthquake, a million times as much. . . ."[37]

After the 1st March explosion Marcus Oliphant, another physicist of high reputation, told an uneasy Australian audience that:

> "The maximum energy which can be released in an atomic explosion is known accurately to those responsible for the recent tests. The meteorological conditions are explored carefully beforehand. It is true that the efficiency of a weapon may be unexpectedly high, but it can never result in the release of energy in uncontrollable amounts. It is equally true that knowledge of the weather is always incomplete and some vagary of the elements can result in radioactivity being deposited over a wider area than was anticipated. If such conditions result in injury to innocent people or in temporary contamination of fishing grounds or of territory, this is regrettable and is clearly a case for the fullest monetary compensation and for the most stringent efforts to prevent a recurrence. However, these things are of such trivial importance compared with the significance of the hydrogen weapon for the future of the human race, that those who try to create hysteria and panic for the safety of Australia are fiddling while Rome burns. . . ."[38]

Both of these men have been honored by their profession. Can it be that they have not heard of the phenomenon of control? By means of a lever, a small force may control a tremendous weight. By means of a set of vacuum tubes (thermionic valves), a digital computer may program a gigantic factory. By means of a photoelectric cell, heavy doors may be operated. The energy of all weather phenomena derives from the sun; the bomb, by means of its capacity to elevate ash, simply furnishes a mechanism for controlling this energy.

The scientific professions hold — indeed, monopolize — a great amount of the accumulated knowledge of humanity. If they allow technical one-sidedness or subservience to prevailing power to interfere with their duty — warning the general populace of imminent, or even remotely possible, danger — they forfeit their right to consume a portion of the labor of society in monopolizing their expert knowledge. From those scientists responsible for actually abetting genocidal experimentation, an irate public may demand an even more rigorous accounting.

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[37] O. R. Frisch, *Nature,* Vol. 173, 13th March, 1954, p. 477.

[38] Marcus Oliphant, "The Hydrogen Bomb — Challenge to Humanity", *Voice,* Sydney (Australia), April, 1954.

A glance over the present study reveals a remarkable fact: All its essential conclusions could have been foreseen — on the basis of currently accepted physical theory and the widely published history of the vulcanism/climate connection — months, if not years, before the thermonuclear explosions of last spring. The body of physical theory to which our scientists supposedly subscribe says one thing. The official theory (as elaborated by Admiral Strauss and other spokesmen) to which the U.S. and its dependent governments subscribe, says quite another. One wonders if our universities and laboratories are not staffed with western Lysenkos.

IX. Conclusion — Thermonuclear Ice Age?

In addition to the radioactive pollution of the earth by the bomb, which has been thoroughly discussed by Laurents,[39] we must now contend with adverse meteorological influences, often of a catastrophic nature. During the entire period of fallout of the elevated ash, we shall be receiving additions to the increasing background radiation — a physically dangerous and genetically suicidal concomittant. During this period the weather will continue to be abnormal, the deviation from normal decreasing as the ash settles out. It is probably not possible to calculate accurately the rate of fallout of the dust, as this depends on precise knowledge of the parameters of the ash and of the initiating explosions.

The nuclear weapons experts tell us that the hydrogen bomb is an open-ended weapon — that is, that the magnitude of energy released is, in principle, unlimited. If thermonuclear experiments continue, the way is therefore open for consequences more devastating than any thus far considered.

One example is the possibility of blasting a portion of the earth's atmosphere out into space. The problem is a more complicated version of the rocket escape-velocity problem. We shall merely note, in passing, that there is a correspondence between the extent of the atmosphere about the earth and the ability of our planet to support life.

A second example is the possibility of disturbing the geological features of the earth's crust. A 31st March article in *The Christian Century* called attention to the fact that the western Pacific, where last spring's tests were held, is one of the world's most unstable geological regions. The article expressed fear that precariously balanced geological forces might be unbalanced by strong blasts, with attendant earthquakes and/or resurgent volcanic activity. We decline to voice a dissenting opinion. One thing is certain: Subjective morality and the supremacy of ends over means have in recent decades emerged so victorious amongst the traditional political and commercial leaders, military men, manufacturers of public opinion, and others in commanding positions in our society that such a genocidal perspective would cause them little alarm.

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[39] Jules Laurents, "Experiment in Annihilation", *Contemporary Issues*, No. 20, October-November, 1954, pp. 214-253.

This charge is not without a precedent. During World War II, the proposal was made in Britain that the volcano Vesuvius, in Italy, be blown up. The United States government (and supporting scientists) entertained the suggestion — with the lives of 80,000,000 people hanging in the balance — that the volcanoes of Japan be activated by pin-point bombing of certain delicate geological positions. Both plans were apparently rejected only because of lack of technical feasibility.[40]

In judging the case which we have presented, one should note how modest is the amount of ash the bomb must elevate in order to do its deadly work upon the weather. The 7.8 million tons of ash which we have estimated (section I) as necessary to disturb noticeably the weather of the entire world is only about one-thousandth of one part per million (by weight) of the air which normally makes up the earth's atmosphere.

It is entirely possible, if thermonuclear tests are held at regular intervals, to produce on earth another ice age. A permanent decrease in mean temperatures of only about 1°C. can depress the snow line some 300 meters. Once produced, an ice- or snow-cap is nearly self-perpetuating, because of its excellent ability to reflect rather than absorb incident sunlight. Humphreys notes that:

> ". . . even this small amount of solid material [the 7.8 million tons of ash from Katmai] distributed once a year, or even once in two years, through the upper atmosphere, would be more than sufficient to maintain continuously, or nearly so, such low temperatures as would soon cover the earth with a mantle of snow so extensive as to be self-perpetuating, through waste of insolation and otherwise, and thereby initiate at least a cool period or, under the most favorable conditions, even an ice age; nor would it make any great difference where the volcanoes [or bombs — K.B.] productive of the dust might be situated, provided only that it was driven high into the isothermal region, or stratosphere, since, from whatever point of introduction, the winds of the upper atmosphere would soon spread it more or less evenly over the entire earth.
>
> "A little calculation shows, too, that this quantity of dust yearly, during a period of 100,000 years, would produce a layer over the earth only about ½mm., or 1/50 inch, thick, and therefore one could hardly expect to find any marked accumulation of it, even if it had filled the atmosphere for much longer periods, and surely none at all if the dust period were only the few consecutive years sufficient, as just explained, to spread self-perpetuating covers of snow over extensive areas."[41]

At present we are on the receding end of a not-quite-expired ice age, and are proceeding toward an age where we shall enjoy the milder climate which has characterized the earth throughout much of geological time. In this climate, there are no polar ice caps. One of the fruits of geological and climatic evolution (as it is presently proceeding), to which posterity has the right to look forward, is the continued recession toward the poles of the thermal limits of habitation, cultivation, and extraction of natural resources.

We cannot escape the possibility that volcanic activity may some day turn the world toward a new ice age. This is one of the elements of fatalism in history, which must be accepted with courage. As Humphreys puts it, at the close of his book:

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[40] Leet, *op. cit.*, pp. 107 and 221-227.

[41] Humphreys, *op. cit.*, pp. 599-600.

> "Finally, as the past is the pledge of the future, it is but reasonable to suppose that the world is yet to know many another climatic change, in an irregular but well nigh endless series, often local and usually slight, though always important, but occasionally, it may be, as in the ages gone — whether towards the auspiciously genial or into the fatefully disastrous — universal, profound, and momentous."[42]

However, if the present generation has inherited that measure of manhood which its forebears demonstrably possessed, a *thermonuclear* ice age will not be permitted. It need not occur, for it is *not* "written up yonder".

As these words are penned, reports are arriving that Russia has completed a "successful" series of nuclear explosions. Apparently the rulers of that oppressed land are striving mightily to equal their Western competitors in loosing mortal dangers upon the world. But there can be no "cold war" justification for thermonuclear weapons, whose explosion — even in "experiments" — constitutes *real* warfare against man and nature. Neither side has any right to ruin the world simply because the other insists on doing so. The people of the world will have to devise suitable measures for dealing with the madness of either, or of both.

It is often jocularly remarked that "everybody talks about the weather, but nobody does anything about it". With all respect to this maxim — and to the masters of the thermonuclear age (who, for their own reasons, proclaim its continued verity) sitting in judgement over the world in Washington and in Moscow — we submit that it is now overruled.

October 4th, 1954.

APPENDICES

A. PRELIMINARY REPORT ON THE ABNORMAL METEOROLOGICAL PHENOMENA CAUSED BY H-BOMB EXPERIMENTS AT BIKINI ATOLL

Meteorological Society of Japan
(31st August, 1954)

Experiments on Hydrogen-Bomb explosions were made several times at Bikini Atoll (Marshall Islands, Pacific Ocean) from March to 5th May, 1954. On 20th May, the Meteorological Society of Japan issued a statement concerning the experiments. Since then a number of the Society's members have taken part in the investigations on the effects of the experiment on meteorological phenomena and have obtained the following results from their investigations up to now. Further investigations are now going on and the detailed results will be published in the near future.

1. Shock-wave caused by H-Bomb explosion[7]

[There follows a table of numerical values of air pressure, as read from barograph and microbalograph records stations at Marcus Is., Torishima Is., Hachijojima Is., Yokohama, Shionomisaki and Kanazawa.]

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[42] *Ibid.*, p. 635.

From these data the shock-wave propagation velocity of about 349 m./sec. [meters per second] was derived and a maximum double amplitude of 0.5 m. Hg [pressure equivalent to an 0.5 meter-high column of mercury] was found in the case of the experiment on 5th May.

2. Contamination of the Atmosphere

(a) Radio-sonde observations of artificial gamma-rays are being made with specially-designed G-M [Geiger-Muller] counters and the results are now under analysis. The artificially radioactive substances were detected from the surface of rubber balloons used for the observations.

(b) Radioactivity of 0.8 to 2.0×10^{-18} curie/cc. [curies per cubic centimetre] were detected in air collected by an impinging dust collector installed on an aeroplane at 3,000 metres altitude.

(c) Mr. Kamada at Kagoshima University detected strong artificial radioactivity in rain water on 14th May (0.02×10^{-6} curie/e.) and on 16th May (0.08×10^{-6} curie/e.). [It is not clear what unit of volume is represented by the symbol "e", although it may well be the litre.] Since then strong artificial radioactivity has been found all over the Japanese Islands. The maximum activity was 0.5×10^{-6} curie/e. observed by Dr. T. Shidei at Kyoto University on 16th May. Dr. F. Yamazaki at the Scientific Research Institute also measured 0.16×10^{-6} curie/e. at Tokyo on 17th May. The presence of fission products was also confirmed at several places, and the artificially radioactive elements detected in rain water up to now are Ba-140, La-140, I-91 [the isotope Iodine-91 undoubtedly does not exist; perhaps Y-91 is meant], I-131, I-132, I-133, Zr-95, Nb-95, Sr-89, Te-129(m), U-237 and a group of rare earth elements, etc. Artificial radioactivity is also found from the surface of vegetables and from the soil of the earth's surface.

3. Contamination of Sea-water

The observing [*sic*] vessel Shunkotsu-Maru made an investigation of sea-water around the Bikini area, and found that a zonal contamination of 300 counts per minute/litre in average, and 6,000 to 7,000 cpm/l. (5×10^{-8} curie/litre) in maximum existed there at 10° to 15° North.

4. Meteorological Optical Phenomena

(a) An abnormal meteorological phenomenon, which is considered to be a Bishop's ring, was reported from a few places and is now under investigation.

(b) An abnormality was observed several times in the polarization of sky light in the former half of August at Tokyo. From the result it is calculated that the sky is filled with dust particles of about 0.8 microns in radius [or 1.6 microns in diameter].

5. Abnormal Climate This Summer

Mean air temperature for June and July was more than 2°C. lower than during an average year in central and northern Japan, and the amount of precipitation was 2,000 mm. more than in an average year. It is reported that the lower air temperature and greater precipitation were observed also in Western Europe and China, and the contrary abnormal air temperature was experienced in Middle Russia, Northwestern America and India. The pattern of this world-wide abnormal climate agrees well with those observed after the explosions of the volcanoes Krakatoa and Katmai.

It is considered that the meteorological effects of H-bomb experiments are of world-wide scale. It is desirable that the materials and the results of investigation concerning the effects of the experiments be exchanged.

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B. THE H BOMB AND THE WEATHER

(Reprinted from *The (Old) Farmer's Almanack . . . for the Year of Our Lord 1955*, Yankee, Inc., Dublin, New Hampshire).

With the conclusion of the 1954 series of tests at the A.E.C.'s Pacific Proving Grounds on May 18th last, a total of 56 different nuclear detonations had been announced; 48 American, 5 Russian, 3 British. Except for two, or possibly three of these, however, the size of explosion was so comparatively small in relation to weather forces that it is doubtful whether or not weather even at the site was materially affected.

Prior to our H-bomb explosion of March 1, 1954, the U.S. Weather Bureau announced (June 26, 1953 U.S. News & World Report) . . . "a mere rainstorm of moderate intensity releases energy at the rate of 3 atomic bombs per second". Don't go away now, however, for despite such an optimistic view, the same agency is also on record with "Nobody can rightly make the flat statement that there can be no relationship between the explosion of these atomic bombs and the atmosphere from which weather is derived".

Since the H-bomb explosion of March 1, 1954, no official statements from those in a position to know about these things has come to our attention with the exception of A.E.C. Chairman Strauss's "at no time was the H-bomb out of control" . . . and Dr. Holzer's opinion that the effect of nuclear explosions on the weather will take 10 to 20 years to determine.

The layman is thus left with the choice of accepting as truth the "pap" from officialdom in the order of that fed to small children by parents and teachers with regard to the facts of life — or by examination of what has "leaked" through the press, to determine, against physical and meteorological backgrounds, the situation for himself.

Two self styled laymen — with reputations as world renowned scientists — have expressed their views as follows — the first in 1946 — the second in 1954.

"These nuclear detonations may bring us a year of drought, or rain, depending on how atom fragments react when they gather to form clouds in the stratosphere and are scattered by stratospheric winds."

"I am myself a layman in meteorology and applied atomic energy. If man will be damaged by such kind of activities — which I do not know — he deserves it."

Even without any "unreleased" or "classified" information in hand however a child of eighth grade intelligence can now determine how it is that our H-bomb detonation of March 1 had the necessary ingredient of size to become a major weather factor. The atomic explosion at Hiroshima (in 1945), is said to have contained something like a 2,000 ton TNT equivalent. It was to atomic detonations of this order the USWB was referring in its minimization of weather effect. But press statements with regard to our H-bomb detonation mention between ten and twenty millions of tons of TNT equivalence. Thus it will be seen that if, as the USWB has stated, "1,000 atomic bombs of the Hiroshima size per minute would match the kinetic energy of a moderate sized hurricane", then an explosion of the H-bomb size (ten million tons) every ten weeks might conceivably keep rain pouring, or cause drought, the world over the whole year round.

For example, if we use another measurement — that of area affected — it will be seen that our March 1 explosion is comparable to the Indian Archipelago earthquake of April 5, 1815, which extended over 1,000 square miles, and completely obscured the sun for twelve long days.

Whether or not it was the stratospheric cloud from this quake which produced the now famous cold summer of 1816, no one can say — but we do know that smoke from forest fires in Western Canada in September, 1950, covered the United States, Canada and Europe . . . with a consequent lowering of temperatures on September 25 and 26 of five to ten degrees. We know that the eruption at Fogo Island on June 12, 1951, is said to have reduced radiation at Appalachicola, Florida, from 96 to 88 per cent of normal. . . .

There are numerous, in addition to those quoted, scientifically observed examples of the weather pattern which might be expected from an explosion of H-bomb size. But even the radioactive dust "fall-out" from A-bomb explosions — recorded all over the United States — is sufficient cause for real alarm.

But to return to what we have politely called "pap" from officialdom, we cannot agree that our March 1 H-bomb was "at no time out of control". It must be perfectly obvious to anyone that just as soon as the dust from that bomb entered our stratosphere it was beyond all recall or direction. From there on out no one can conceivably argue that it did not become a major factor in present day weather making processes — what sort of factor, except possibly harmful and dangerous, nobody alive can say.

According to scientists McNown and Malaika only . . . [a proportion] of the moisture gathered aloft by sun and wind returns to the same locale. In brief, what rain we do get for the most part is not native. At times it may even be of the best Russian, Chinese, and now H-bomb, variety. . . .

But even more disconcerting is perhaps the conjecture about this H-bomb dust in its relation to that little understood, frequent weather phenomenon — the tornado. Here we have something which, through the convolutions of warm air rising to meet cold air upstairs, concentrates with immeasurable force on a relatively small part of the earth's surface to cause terrifying damage. It is conceivable, without creating any cause for being considered alarmists, that within the area in which tornadoes form, may now be found also concentrations of H-bomb dust which — together with all the other tornado ingredients — may make other tornado visitations seem like harmless picnics.

It is in this area then of tornadoes, and hurricanes — as well as drought and added rainfall extremes — we find the scientists, under the head of a statement by L. L. Strauss, Chairman, A.E.C., and Charles E. Wilson, Secretary, Department of Defense, "have contributed materially to the security of the United States and the free world". The rest of the world is provided for similarly with, presumably, the Soviet H-bomb experiments.

To a tiny handful among us billions of world people — some of whom are at least sympathetic to taking over from God the very power of Creation — we have then delegated the free and untramelled right — through experiments in the atmosphere they do not and never will understand — to endanger our very existence — from behind absolutely closed doors of secrecy.

It must be obvious to every God fearing, thoughtful man and woman, to the Congress, to our President, that unless and until the bans of secrecy with regard to everything except actual manufacture of and detonation gimmicks of the H-bomb and the forthcoming C-bomb are lifted, we Americans — and all free people of the free world — have lost something greater than national security. We have been deprived of our fundamental "consent to be governed". Even the guinea pig — which never knew what freedom really was — may be said to have it better.

REACTIONS TO "STOP THE BOMB"

THE March 1954 hydrogen bomb explosions in the Pacific gave rise to a manifold, unorganized world-wide protest. No reassurances from A.E.C. chairman Strauss and his cohorts could allay the horror and revulsion that these tests evoked. Subsequent findings, radioactive tuna, fall-out, abnormal weather conditions and most important, the damage done to innocent people, only reinforced the initial reaction. The voices of protest, however, were scattered, lacking the strength and effectiveness of a unified movement.

The individual, although beset with "organization" from the day he is born, finds few groups through which he can express his opinions and wishes. Daily he encounters religious organizations, governmental agencies, charities, fund-raising drives, welfare societies, labor unions, political parties, cultural fraternities, sports clubs, *ad nauseam*. Yet if he wishes to protest and to join with others against such insanity as exploding Hell Bombs, there seem to be no organizations which easily lend themselves to his purpose. The demand to stop the explosions is apparently too simple for complicated organizational life. It either does not lie within its "province" or, if an organization considers it at all, it must be coupled with "more fundamental" demands for complete disarmament, international conferences and other diversionary tricks utilized by Stalinists, American authorities and others. A virtual organizational vacuum existed between the opposition to the bomb and the means to express it. To voice the protest unambiguously and to provide the required information about the effects of the explosions, we issued a leaflet, *Stop the Bomb,* and subsequently devoted an issue of this magazine (No. 20) to the problems concerned. At the very least, the first steps in an uncompromising campaign against the bomb had been taken.

In consequence, the oft-repeated accusation of "apathy" levelled against the American and other peoples was once again unmasked in its true function as propaganda and a liberal's excuse for doing nothing. Twenty thousand leaflets, an apparently insignificant number, distributed, mostly by hand in New York City, and by mail to various points in the United States, Canada, Europe and Japan, received answers from the four corners of the United States, from Canada, Australia and South Africa; was reprinted in the Dutch magazine *De Nieuwe Stem,* in the Indian magazine *The Radical Humanist,* in the Japanese magazine *Kaizo,* in several Japanese newspapers and received front page coverage in the leading Japanese daily *Asahi Shimbun.**

The typical reaction to the bomb in the United States as manifested by the many letters we received was that "despite my not having any knowledge of certain facts dealing with atomic energy and the various bombs we have developed from it, something within myself senses the possibility of harm that could be done by 'mere testing', besides realizing that we cannot be strong, secure nor safe when forever thinking of how to ward off attack by flaunting this monstrosity in the face of our enemy, let alone the actuality of eventually using this weapon which can only end in utter ruin for all sides". This particular writer enclosed a letter to be forwarded to Lewis Mumford, the author of a note of protest to the *New York Times* which we had commended in our leaflet. More than half of those responding required additional copies of the leaflet, ranging from "one for a friend" to "as many copies . . . as you wish widely and advantageously placed among hundreds of my friends around the country who are articulate and fearless and who would do something to — Stop the Bomb". All the letters indicated: ". . . I feel very strongly about this and would like to take some action . . ." and asked what they could do to further the protest.

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*Since this was written we have had a request from M. Marcel Péju, Secretary General of *Les Temps Modernes* (Paris) for permission to translate and reprint Jules Laurent's "Experiment in Annihilation" (printed in No. 20). Permission was, needless to say, given with great pleasure. — *Ed.*

A few replies presented a plan for furthering the campaign (e.g. Mr. Hall's letter printed in No. 20 with a reply by Paul Ecker) or criticized certain aspects of the leaflet. One such reader remarked that he had already distributed "part of the leaflets and shall send out the rest to-morrow. However, in accordance with my well-founded knowledge, I had to mark the passage 'shaky Russian Slave Empire' adding a note of interrogation on the margin. The content of the leaflet is excellent; why this passage?" We should like to compliment Mr. C. on his correct and honest procedure — a course of action exceptional in comparison with the generally low level of political morality to-day. *The National Guardian,* for example, reprinted selections from our leaflet in its 9th August edition. In excerpting, the *Guardian* omitted our strongly critical characterization of Russia. They did not, as Mr. C. did, demarcate our position from theirs by the inclusion of this phrase. Protesting this distortion, Harold Wurf of *Contemporary Issues* wrote:

> "This omission on your part is all the more reprehensible since *The National Guardian* consistently sanctions Russian policies which no objective reader could possibly regard as less obfuscating than those proposed by Washington, and your propaganda against nuclear explosions on the grounds of radioactive pollution is shrewdly mingled with urgent pleas to support Russian proposals for a ban on bomb production. In so pleading, you do nothing but further the game of musical chairs being carried on between the Malenkov régime and the Eisenhower administration. . . . In our opinion, *The National Guardian* has an inherent right to print what it pleases. But it also has a social responsibility, when it prints excerpts from the press of bitter political opponents, to indicate the differences which exist between itself and them."

It is regrettable that the continuation of this letter did not hold strictly to condemning *The National Guardian's* atomic propaganda and policies, but wandered into a general denunciation of Stalinism, thus permitting *The National Guardian* to avoid the onus of their irresponsible and misleading role in the bomb campaign and even to chide:

> "I am sorry that you felt it necessary to write me such an ill-tempered letter; . . . we will include what seems to be the pertinent part in an early issue." [The August 30th edition did indeed carry relevant sections of the letter.]

Mr. Belfrage of *The National Guardian* was surely *formally* justified in objecting to the ill-tempered letter sent him, but this avenue of escape nonetheless leaves behind it the traitorous role in the anti-bomb campaign of Mr. Belfrage, *The National Guardian* and the Stalinists whom they both serve.

However, back to Mr. C. Because of his honest approach, it would be interesting to discuss his "well-founded knowledge" based on "eye witnesses from various countries — non-communist ones and scrutinizing — who have freely travelled there [in U.S.S.R.] non-guided . . . among them friends of mine from the United States and Germany". But for the time being we must work together for the one purpose: *All* experimentation with nuclear power must cease, regardless of our differences in other arenas.

Soon after the press reported the explosions, editors of newspapers and periodicals began to receive letters ranging from mild dissent to outrage. Two such outstanding protests to the *New York Times* were written by Lewis Mumford (referred to above) and H. David Kirk. In answer to the letter we sent him, Mr. Mumford wrote:

> "I have been preoccupied with the writing of a book. This explains and I trust excuses my tardiness in answering your letter of 17th April. I regret that my present work makes it impossible to respond to your invitation. The threat of mass extermination has been one of my main concerns since 1945; and in the autumn I shall collect some of the essays I've written on the subject. . . ."

Nevertheless, it is important that Mr. Mumford actively participate in this campaign. His voice has already been of great value and can assume even greater significance and effect.

From Mr. Kirk, to whom we also wrote:

> "Thank you very much for your letter and the enclosed pamphlet. I like the forthrightness of the latter and am glad that you were able to make use of the letters by Mr. Mumford and myself. I gather from your letter to me that you might be interested in some further expression of opinion. Since you are planning an issue of your magazine around this matter of the H-bomb, I would very much like to do an article, expanding some ideas concerning the personal responsibility of citizens and the structure of the modern state. In fact I have been asked to preach at the local Universalist church here on May 16th and will then deal with that issue. . . ." *

Other articulate opposition to the bomb bursts came from pacifist and religious organizations. We wrote to the American Friends Service Committee which answered as follows:

> "Thank you for your letter with its comment on our statement in the *New York Times* about the hydrogen bomb. We were interested to learn of your own constructive efforts and are encouraged to believe that many others are likewise exercised over this problem.
>
> "While we have no immediate suggestions regarding your planned public meetings, we shall be glad to know of your success and might perhaps be able to co-operate as your activities develop."

Mr. Olcutt Sanders and the Friends were unique for their friendly reply. Despite the lack of similarly co-operative offers from the Fellowship of Reconciliation and the War Resisters League, material from and actions taken by these two prominent pacifist groups have come to our attention. A recent effort has been the July issue of *Fellowship* entirely devoted to subjects related to the hydrogen bomb. There was also a joint demonstration carried out with the Catholic Worker and the Peacemakers on 6th August before the Japanese Consulate. The demonstrators presented a letter to the Consulate addressed to the people of Hiroshima and Nagasaki expressing:

> ". . . our deep sorrow over these atomic bombings . . . there are Americans who are deeply disturbed by these acts. We also realize that these weapons are the logical development of the way of violence and war. If we are convinced of the horror of these weapons, then we must also remove that from which they sprang.
>
> "We are Americans who have renounced all participation in war and have demonstrated this in our actions. There is no hope in any support of either the Soviet or American Power Blocs.
>
> "The only hope lies in the following of a third way of love, courageous non-violence, building of a just social order, active struggle against all injustice. These we must apply in our lives and in active efforts to transform society.
>
> "The bombs of Hiroshima and Nagasaki are a sign of the destruction man will

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*Mr. Kirk's sermon appears on pp. 162-168.

> bring on himself if there is no change of heart, no peaceful revolution against the forces leading to atomic war and slavery. . . ."

Indeed, it is very important to tell the Japanese that informed Americans do not support their Government's actions. However, the emphasis on using the bomb as a war weapon is more than a trifle misleading. This stress takes on fuller meaning in the issue of *Fellowship* mentioned above. The lead article by Alfred Hassler discusses "The Race that Ends in Death", an eloquent title for an article agitating against stockpiling of bombs (the Hydrogen Bomb regarded simply as an incomparably more destructive weapon):

> "In such a state of tension, we propose to build up larger and larger stockpiles of bigger and bigger bombs, so the enemy's *fear* of our ability to retaliate will keep him from striking the first blow. But simultaneously the enemy will also build up larger and larger stockpiles of bigger and bigger bombs with the argument that *our* fear of his ability to retaliate will keep *us* from striking the first blow (since the Russian confidence in our non-aggressive intentions must be considered somewhat weaker than our own).
>
> "But fear works both ways. As we sit on our bombs, we *shall* be fearful of the enemy's ability to retaliate. *We shall also increasingly grow to fear that he will strike the first blow anyway, being the demonic sort of character we have convinced ourselves he is. And the enemy will be experiencing the same fears about us!*
>
> "Which side breaks first and takes the desperate chance of striking one swift and paralyzing blow is less important than the certainty that in such a situation one side or the other eventually will break. The very unprecedentedness of the power of the bombs on which "deterrence" is based is the fact that will make it inevitable. . . .
>
> "It is a grim but accurate picture. War has come to the end of the road. It has nothing to offer us now but death, and the only hope that remains lies in renouncing it utterly and moving into new areas of political and social action."

Aside from the gibberish about "fear", as a cause of war, we can agree that "war has come to the end of the road". However, the primary task of any responsible person in a discussion about thermonuclear weapons is to point out that its use as a war weapon is not a prerequisite for its destructive capabilities. The dangers involved in simply "testing" even for "peaceful purposes" can be seen from this partial account (unchanged) from Japan:

> "I am afraid you might know already, but let me report you this time that aside from tuna and other sea fish, even vegetables in this country now are more or less dangerously radioactive, as the earth itself is fully radioactive by now due to incessant rain falls according to the thermonuclear scientists in this country. Now we have to live on foodstuff all radioactive.
>
> "Furthermore, a recent report from University of Niigata, a city on the coast of the Japan sea which is some two train hours from Tokyo, revealed that the air in the district is densely radioactive, which was discovered as the result of a post-mortem held on the remains of a patient who died from a liver trouble. Checked with a Geiger counter, the liver of the dead man showed 200 radioactive count, paper reported."

Radioactive food and radioactive air resulting from a "peacetime experiment"! The question poses itself not in terms of the eventual use of these weapons in war, but of the present contamination of the very essentials of life. To pose it otherwise falls precisely into the trap set by those interested in continuing their stupid and pointless "experiments". The appropriate demand must be the cessation of all experiments, without condition.

In any case it is a truly strange method of opposing the bomb to demonstrate before the Japanese (!) Consulate. It recalls a portion of another letter:

> "There is an A-bomb memorial monument built by the hands of Japanese in Hiroshima and its inscription cut in Japanese reads:
>
> 'We swear not to repeat such a mistake again!'
>
> Nothing can be more ridiculous than this for us Japanese. Naturally such an inscription ought to be written by Americans in English."

The misplaced demonstration before the Japanese Consulate would seem to be not so much an aberration but an extension of the same type of contempt for the American public as is expressed by Hassler:

> "It is hard to . . . imagine what more information people need than they already have. To paraphrase one commentator on the subject, it is difficult to see what effect the news of a bomb that could destroy three-quarters of the globe could have on people unaffected by one that can destroy half the globe."

To regard the American people as "informed" about the effects of the bomb explosions is the height of self-imposed political blindness. The wall of deliberate lies, distortion and outright omission built up by the A.E.C., the government officials and the press is an insuperable barrier to most and, while under the constant pressure of an inarticulate resistance, can only be broken down by the diligent probing of those who know how to utilize the crevices and cracks in the mortar. When this wall presents a perceptible opening to the millions bound by it, then, as they surge through it, will the protest of the American people be seen. In some measure, among enlightened people, this protest has already reached a high mark.

The assembly of the World Council of Churches at Evanston, Illinois (*N.Y. Times* of 30th August) resolved "The prohibition of all weapons of mass destruction; including atomic and hydrogen bombs, with provision for international inspection and control such as would safeguard the security of all nations, together with the drastic reduction of all other armaments".

We should like to interject here that these demands, characteristic of many other organizations, will appear again and again as we go on. It may be that the crucial decision for the campaign will be to recognize the latter half of the resolution, i.e. the section calling for international inspection and control and other such suggestions, as commonly-held misconceptions nourished by the governments. To couple them with stopping the bomb can divert, if not entirely mislead, the campaign into sterile and ineffectual struggles.

As described by one of our friends in replying to a correspondent, power conferences for international control and inspection are only,

> "a smokescreen behind which both powers would continue making and using genocidal weapons. . . . Both are engaged in a kind of circus of putting forth mutually preposterous 'demands' which each knows the other will definitely refuse, and then pointing up the other's 'intransigence' as justification for its own outrageous actions. . . . The hydrogen bomb is the deadliest thing produced on this earth. Whoever explodes the bomb, whether because an opponent has it or not, is adding more and more poison to the world. . . . In this we must . . . forewarn . . . of any attempts to sidetrack the real issue in an irrelevant 'four-power' comedy".

For the Catholic hierarchy, in contrast to the badly qualified resolution of the Council of Churches, all doubt has been removed by the Pope sanctioning the use of the bomb in "self-defense":

> "For our part we will tirelessly endeavor to bring about, by means of international agreements — *always in subordination to the principle of legitimate self-defense* — the effective proscription and banishment of atomic, biological and chemical warfare". (*N.Y. Times*, 4/19/54 — Emphasis added.)

This surely does not meet with the approval of millions of Catholics and must be thoroughly exposed for what it is — reactionary endorsement of continued experiments.

The rôle of the scientist in the campaign to stop the bomb could be a uniquely effective one. The authority and information with which he speaks could pierce the "uranium curtain" thrown around the effects of these experiments. Although the overwhelming majority of the scientists in the United States has been silent, it is possible to point to several men of integrity who have issued public, though mild, statements. Dr. A. H. Sturtevant of the California Institute of Technology warned (as reported in the 11th September edition of the *N.Y. Times*):

> "The human race will reap a macabre harvest of 'defective individuals' because of the increase in 'background radiation' caused by only the few atomic and hydrogen bombs that have been exploded to date. . . ."

Despite this gruesome perspective, Dr. Sturtevant went on to reassure,

> "that he is not offering an argument against the explosion of atomic bombs in the future or the peaceful development of atomic energy. . . . 'It may be that the advantages ultimately to be derived from atomic explosions will outweigh the biological damage they do. But it must be remembered that the risk is one to which the entire human race, present and future, is being subjected' ".

Dr. Mortimer R. Camiel, a radiological expert, wrote a forthright letter to the *New York Times* about the dangers of radiation to the human body. Though Dr. Camiel has not responded to our letter, we did receive the following from Professor Norbert Wiener:

> "I have been so occupied with writing a new book that I have been unable to write magazine articles during the time. . . . I suspect that both books, of which you can obtain the second already, may contain about what you wish me to say. I therefore suggest that you look through the two books as they come out, and if you wish to extract some material for the use of your journal, please write to me again about it."

At this writing, only Dr. Wiener's *Human Use of Human Beings* has been issued. This book has many interesting and informative things to say, but we found nothing with direct bearing on the issue. Subsequently, Professor Wiener wrote a short article for the *Nation* on the Oppenheimer case from which we should like to quote the following:

> "The essential point of the whole dispute between Dr. Oppenheimer and his accusers is that it is taking place at a time when there is a certain amount of pressure to use the most horrible forms of atomic warfare in a preventive war. Such a proposal could not stand up for five minutes before the informed conscience of mankind or indeed, before the informed conscience of any great country. It is therefore necessary for those behind the scenes who secretly support this expedient to see to it that public opinion concerning it be ill-informed".

That's the point: "Such a proposal could not stand up for five minutes before the informed conscience of mankind or indeed, before the informed conscience of any great country". Here is where scientists can play a unique rôle in this campaign, countering the conspiracy of silence, distortion and false statements about the effects of the explosions with — the truth.

In this connection it should be noted that, although the *Newsletter* of the Society for Social Responsibility in Science carried articles on the Oppenheimer case, they neither responded to our leaflet nor did they publish articles on the dangerous effects of the hydrogen bomb explosions *per se*. To the very contrary, in their October 1954 *Newsletter*, it is reported that at their annual meeting this year "the Council had . . . rejected a proposed statement on the Japanese H-bomb victims because of lack of agreement; O. T. Benfey had felt it criticized our Government unnecessarily. . . ." *The Bulletin of the Atomic Scientists* took a happier stand in deciding to reprint in their October issue a letter to the editor based on the Oppenheimer broadcast (which includes much information on the effects of the bomb itself) printed in No. 20 of this magazine. This letter continues the theme of the broadcast, posing the question in terms of the Oppenheimer case. Even though the November issue of the *Bulletin* continues with some mildly informative articles on the effects of the bomb, it appears that "responsible" scientists and their publications only permit themselves to see this issue in any importance as refracted through the problem of Oppenheimer. Scientific specialization cannot divorce the scientist from his responsibility to society. Even in his own interest, the scientist can do no other than take a stand against any further blasts.

It should be instructive for American scientists to give heed to their colleagues in other countries. The Hiroshima University Elementary Particles Research Society, for example, issued a statement (Scientists, attend!):

> ". . . opposing the 'atomic reactor' budget. The government had appropriated 230 million yen in the fiscal 1954 budget for subsidizing the construction of an atomic reactor. The reactor would serve as an instrument for manufacturing atomic bombs as well as for peaceful purposes, the statement said. Considering the 300,000 victims of the Hiroshima and Nagasaki atomic blasts, the society cannot co-operate in research for the production of atomic weapons, the statement said. An enormous sum of money needed annually for the atomic energy research will put a squeeze on basic scientific research in general, the statement further said. Research on atomic energy will require secrecy, and under this secrecy it will be impossible to conduct open research, by causing a split in the country's scientific circles, the statement stressed".

The Japanese, "thrice baptized by Hell Bombs", rallied to our leaflet; good fortune in the person of Mrs. Momoyo Hara "immediately went to the *Asahi*, topmost [newspaper] to let it help me . . . [publicize] the gists of your drive among the public. They willingly accepted my proposal at once. Enclosed please find the clippings of the article about it which appeared in to-day's [6th June, 1954] issue. I am going to consult with a magazine publisher or editor to let my translation of the pamphlet be published in a progressive weekly or monthly". (The entire leaflet was published in the August issue of the *Kaizo*.) This publicity resulted in a flood of letters to Mrs. Hara and many to us. At a later date we hope to be able to present a report from Japan. At this moment we have only the letters written to us:

> "It was not a pleasure, but, in fact, a surprise for us Japanese to see the newspaper account about the pamphlet 'Stop the Bomb', and to know that there are many people also in America who want to stop the A-Bomb or H-Bomb. As you say, to call out to stop the bomb to other nations in the world is, in any case, a duty and a right of the Japanese who had the bitter experience of the first A-Bomb in the world and who now are set under the terror of the experiment of such a bomb as has the ability of killing a man with only a bit of it. . . ."

Official propaganda has so well erected a "uranium curtain" between these two peoples that the Japanese are as unaware of opposition in this country as we are of the effects of the Bikini explosions. Many letters received from Japan indicated similar "surprise" that there were Americans opposing the bomb. From these correspondents we received accounts of bomb effects that were either not reported at all in American papers or presented in a distorted fashion. So, for example, the *N.Y. Times* of 5th July reports that a survey expedition by Japanese scientists to study the Pacific Ocean indicated:

> ". . . that they had safely eaten raw fish caught in the Bikini waters. . . .
>
> "Some of the twenty-two scientists scoffed at what they termed 'over-nervous' Japanese who had destroyed quantities of suspected tuna after 23 fishermen reported they had been burned by radioactive ashes from the March 1st blasts.
>
> "Nonetheless Dr. Hiroshi Yahe, the chief scientist, told a welcoming crowd of 2,000: 'We have found out that H-bomb tests seriously affected sea water, fish and other marine life. . . .'
>
> "Dr. Kazuhisa Kameda said many of the fish caught in the test area were radioactive about the gills and internal organs but 'we ate the raw meat of such fish'."

The same news "reported" by one of our readers:

> "Having finished a 9,000 mile ocean survey mission in the Southwest Pacific, the 588 ton research ship *Shunkatan Maru* arrived at Tokyo on July 4th. It took the Fishing Board's research vessel 51 days to investigate the effects of the United States hydrogen bomb tests in the Pacific on the ocean and on marine animal and plant life. The survey group members were 72 scientists, reporters and crewmen. They brought back a lot of valuable material and data, the conclusion from which will take two or three months synthetic study. . . .
>
> "According to the message of the Head of the survey group: . . . 'Frankly speaking, we found that the explosion of H-bomb had a grave effect on sea-water, fishes and other living things'. . . ."

Anger and indignation against the irresponsibility and high-handedness of the American authorities are justifiably disclosed in the following letter from Mr. Hiroaki Saito, a student in Waseda University:

> ". . . reading the article of your anti-bomb test movement in the *Asahi* on June 6th, I was very sympathetic toward you. And so, I asked Mrs. Hara . . . [for] your address, and I am now writing this letter with a great pleasure. . . . I would like to relate my opinions of H-Bomb problems a little bit as a Japanese.
>
> "We, the Japanese people, have undergone baptism by A-Bombs twice. And now, 23 Japanese fishermen were scratched by the nails of [the] dangerous monster, again. However, we have no intentions to offer for sale these sorrow scars . . . to get the sympathy of the world nor do I want to give a lecture about H-Bomb powers. . . . Many Americans must know how terrible it would be if the H-Bomb were to be detonated (I think, especially those who participated in the test of the H-bomb or Dr. Morton, a member of the Hiroshima A.B.C.C. and so forth), but . . . Americans only know the ideal horror of it. So, I would like to tell you in a concrete form.
>
> "It was on August 6th, 1945, when this atomic weapon was put into practice. And at that time, A-bombs dropped on both Hiroshima and Nagasaki were detonations of uranium and plutonium causing damages by violent heat, blasting wind and radioactivity. . . . It is said that the heat in its center-place of detonation rose 4,000 C.° (melted iron in the furnace is 1,500 C.°). . . . But for the H-bomb, it rises 'two hundred million C.° (it is unimaginable for us). The heat rises so high that things [at a distance of] 20 to 30 km in radius will fly off in vapor . . . people get burns themselves. The burns of [the A-bomb] victims of Hiroshima are called keroids. Purple cicatrices swell up and they feel a pain and itch even after a few years . . . even if they have many operations, these . . . [purple swellings] rise one after another. But the 23 fishermen of the ‡5 *Fukuryu-Maru* who suffered as a result of the H-Bomb blast at Bikini Atoll were not affected by its heat, blasting wind or radioactivities, but were covered with 'ashes of death' for five hours, not knowing how dangerous the ashes would be. As a result they got atomic diseases. The causes of these atomic diseases are radioactive materials which are made by the A-bomb blast. If these materials enter our bodies, they subside into the kidneys or thyroid

> gland and cause them to lose their activities. In the case of the fishermen, the radioactivities were absorbed by the marrow so that the operation of making blood was disrupted and the white blood corpuscles are about 1/10 below [normal] or more. If they get a small scar, it will not . . . [heal] because the resistance for bacteria is so weak. But even . . . [without scars] there are too many people [in Hiroshima and Nagasaki] who die for the lack of white blood corpuscles every year.
>
> ". . . Dr. Morton of the Atomic Bomb Casualty Commission says that their condition is not severe. Is it any wonder that the Japanese cannot keep their tempers? Radioactive materials also subside into the ovary or testicles so that they lead to sterility or make people bear a malformed child. I have mentioned many things concerning the H-Bomb blast, but it seems very hard for me to explain the horror of nuclear weapons completely. The best thing is to look at it through eyes. And if you would like to have pictures concerning the damages of A-bombs or H-bomb, I . . . [will] send you some.
>
> ". . . To-day, in Japan, anti-American feeling has been increasing rapidly since the H-bomb tests in the Bikini atoll. The greatest reason for it is the boastful attitude of the American government. We got angry, because of the statements made by the American government that 'Japanese fishermen must have been spies', 'damages are not severe', 'we refuse to buy tuna cans from Japan', 'we shall continue the tests', and so on . . . I hear there are some Americans who oppose our anti-H-bomb tests movement. However, it is as natural for Japanese to demand no H-bomb tests [as it is for] Americans to refuse to import combustible fibre because it caused an American girl to get a burn.
>
> "The Pacific Ocean is not a lake of the United States and we, ourselves, are not mormots [*sic*]. It is natural not to do such things abroad as one is unable to do at home. Surely, the American government has done the tests, but those who selected [the government] were Americans. And so, it is a duty of all Americans to stop the tests which are being carried on by the American government. . . . If America continues to [conduct] these tests, we regard Americans as challenging human-kind. I have never read the Bibles of President Eisenhower or Mr. Dulles. Do they have different ones? Do they go to church? I wish to send new Bibles for them. 'Thou shalt not kill', 'Whosoever committeth sin transgresseth also the law', 'For sin is the transgression of the law'. They should pay attention to these words.
>
> "A few days ago, I saw a newsreel, and it showed training for dispersion [in the event of] the A-bomb in New York. But I laughed in spite of myself. It is very funny if they think they will be saved like this. It might be all right, if they wish to commit a double suicide with skyscrapers, but if not, they should exert themselves not to do such silly trainings. . . ."

Another Japanese inquires:

> "As for the use of vast areas of the Pacific Ocean to explode the monstrous A- and H-Bomb, I think it is illogical and egoistic. . . . If your claim is right, you must permit Russia the same. Can you admit Russia to use the Bering seas, the Gulf of Mexico or the Atlantic Ocean off New York to experiment [with the] H-Bomb? If Russia explodes cobalt bomb in the Bering Sea in the name of 'experiment', the jet stream will immediately carry the 'death ashes' over your country . . . do you believe that your American citizens are safe from radiation? What in the world is freedom, liberty or democracy that [it] should be protected at the cost of civilization and human existence on earth?"

Mr. Yamamoto and six other of the hydrogen-bomb dusted fishermen (interview by Mrs. M. Hara in the *Asahi* of 28th August, 1954) demand only:

> ". . . an on-the-spot ban on H-bomb tests . . . the mere thought that some day other persons may share our pain and trouble is too much for us. Let us be the last H-bomb patients, we do hope!
>
> "It is unconvincing for us that Dr. Morton, former chief of the Hiroshima Atomic Bomb Casualty Commission, and Admiral Strauss of the Atomic Energy Commission declared 'the 23 Japanese fishermen of the ‡*5 Fukuryu Maru* will be completely cured within one month or so'."

These words are unconvincing indeed to the widow and orphans of the fisherman Kuboyama, to the families of the men now wasting away in the hospital. These words cannot restore health and vitality to the victims of Hiroshima and Nagasaki. It is truly little solace that we are "promised" "free electricity" in a generation or two. Coffins do not need electricity.

The Japanese people, unhappily armed with the knowledge of the results of atomic blasts, are moving to stop any future explosions. The world press in general has maintained a consistent blackout on anti-bomb activities in Japan. From Mrs. Hara we learn:

> "A passage of your letter saying 'As a reasonable goal in Japan, it would seem wise to demand that the Japanese Diet come out with a strong resolution . . .' served me as an eye-opener . . . to the deplorable fact . . . that almost all . . . written protests or demands or petitions were not known by your American people. . . . Enclosed please find some newspaper clippings which will show you some of the aspects regarding the H-bomb issue in this country. These may tell you that not only the Upper and Lower Houses Joint Committee, but many other organizations, public and private already presented each a petition or strong protest to the White House directly or through the American Embassy in Tokyo, against the use of the H-bomb. Of course they also demanded repeatedly for U.S. compensation for the unfortunate victims along with that for Hiroshima and Nagasaki survivors who are mostly in financial distress due to years of medical expenses, not speaking of their semi-permanent unemployed condition . . . really, you Americans are under the Curtain of Uranium instead of the Iron Curtain. My writing [about this lack of knowledge on the part of the American public] will surely be a big surprise and bombshell appeal to the general public in this country who think you Americans know well about the details of their activities against the bomb".

Another correspondent corroborates that these activities are part of the everyday life of the Japanese:

> ". . . here in Japan, hardly a day passes now without thinking or hearing something on that very subject, since our daily life seems to be so closely bound by the radioactivity and its effects . . . many of my friends and women's organizations with which I am connected are anxious to have them [*Stop the Bomb* leaflets] for further use. Kindly send me 200 copies at your earliest convenience. . . ."

A seventy-year-old man whose "house, furniture and books were burnt by the war-fire" volunteers a small article (in English) on the "Feelings of the Japanese People at the Moment". Since we could not print this moving appeal ourselves, we suggested to its author, Kinjiro Kishimura, that he send it to several other magazines which might be able to do so. We were pleasantly surprised to see Mr. Kishimura's letter reprinted in the October issue of the *Bulletin of the Atomic Scientists*. Another writes:

> "I have taken the liberty of asking you whether I can do anything for your campaign. The people all over the world . . . do not know the real danger of the bomb. We only know it.
>
> "With the purpose of introducing the real misery of the bomb, I have been translating the letters written by the victims of atomic explosions in Hiroshima. But to my regret, I haven't known where I may send it. They are collected in a book by late Professor Nagata as the appeal of the Hiroshimaites to the whole country for the prohibition of atom-power as a weapon. . . ."

To enlighten us further, a victim of the Hiroshima bomb has taken the trouble of translating the account of his experiences. Lengthy though this statement may be, it is impossible to refrain from reproducing at least some excerpts:

> "It is very fine to-day, September 2, 1946. But it was drizzling on the same day last year. On the morning of that day, my father died from the severe burns

> caused from the atomic bomb blast. He had suffered a bitter pain for nearly a month. But his death was very calm. . . .
>
> "On the morning of that ominous day, August 6, 1945 . . . I was praying as usual . . . when we heard a sudden booming sound of an airplane, and the next moment we felt a terrible flash. . . . The flash was so terrible that we . . . scattered at once seeking shelters. As I was running down deep into the ditch . . . I heard a dull but strong explosion and felt a hard shock. . . .
>
> "[Afterwards] looking toward the north-west, I saw a lot of white smoke rising up to the sky from below. It looked just like a big pillar made of white cloud. The white smoke was rising so much from below that the pillar of smoke seemed hardly to disappear.
>
> "We began to argue at once about the strange effects of the explosion that we had felt. But no one was aware that it was the most dangerous new weapon, of course. . . .
>
> "Soon, we were assembled and told that the bomb had been dropped in the east part of the city and that those whose houses were in that part could go home at once but that all the rest had to begin work as usual.
>
> "My house was in the west part of the city. And the City Hall in which my father was working stood in the central part of the city. Therefore, I thought both my father and mother must be safe.
>
> "Thinking this way, I went upstairs. . . . We were about to begin our work after clearing the room of all debris, when we were ordered . . . to go to rescue the injured coming from the city. . . .
>
> "Seeing the injured crowd on the ground I shuddered and felt as if I were in Hell. Their clothes had been burned for the most part and some of them were even naked. Many were smeared with blood and some were burnt black. The hospital . . . was full of such badly injured. They were all laid on the floor . . . [They] were coming here in great number more and more like the flood. Many trucks were carrying them here, too.
>
> ". . . While we were carrying those injured, we heard that many houses even in the central part of the city were in flame. And I began to feel anxious about my father. . . .
>
> "Towards the central part of the city through which I was to go back to my house I saw a very big flame of fire. And the twilight sky, full of smoke, and reflecting the big fire, showed a terrible crimson color. . . . Every house along the street had been damaged in the roof and windows. Many houses were leaning and some were even fallen to the ground.
>
> "Soon I came into the fire zone. All the houses within the zone were on fire. . . . Bridge after bridge I crossed, but I was still walking through the furious fire. The fire zone was unexpectedly wide. . . . At last I came to the last bridge. Was there no fire across the river? Alas! There was. All the houses were on fire there, too.
>
> "I realized that my house was burnt and all my books and musical instruments, which I loved, turned to ashes."

The author discovered that the people in his district had fled to Jigozen, a little village about ten miles from his home. After locating his mother there and bringing her to a relative's home, he proceeded to search for his father whom he found five days afterwards badly injured in a school serving as a hospital.

> "I remember, I could not believe the injured man to be my own father at first, for he had been so badly burnt that I could not trace my father's features on that man. His face and neck were all covered with a paste of blood and pus, and he seemed to be an ugly devil. . . .
>
> "A little later the doctor went away. As he was leaving us, he took me to the door and said, 'You had better not touch your father, because some people have been infected with the injury only by having their hands smeared with the pus or blood of the injured people. . . . The new weapon of Hiroshima is so poisonous that even those who did not receive any injury are dying only because they went to Hiroshima after the new weapon exploded'."

Despite the care of his family, the boy's father died of his injuries.

> "A year has passed since the sorrowful day. My grief decreased very much

> since then. Nowadays I feel that the memories of my dead father, who was always hoping and trying to live a virtuous life, are shining like stars in my mind to guide my way of life.
>
> "Regarding mother, the slight burn in her right leg has not healed over yet. If it had been an ordinary burn, it would have healed up in a few weeks. But she is much better now.
>
> "If you ask us whether we hate the Americans for dropping the atomic bomb on us, we, who survived the atomic bomb in Hiroshima, would answer that we have not been able to forget the hatred toward them even now. No one, who had seen so many people burnt to death suffering bitterly for a long time, would be able to forget the hatred easily.
>
> "Also we have the following viewpoints for our hatred. We used to discuss about the atomic bombs comparing them with the poison gas used by the Germans during the World War I. The Germans used their poison gas in their desperate offensive against overwhelming enemies, but the Americans used their atomic bombs against a far more weakened enemy which would have been defeated sooner or later without being attacked with the atomic bombs. And while the German poison gas was used against the enemy fighters, the Americans used the atomic bombs against non-combatants.
>
> "From these points of view, we cannot help thinking that the American atomic bombs were used by a more cruel motive than the German poison gas.
>
> "But, we feel that to forget the hatred is to decrease our unhappiness. Therefore, we are trying to forget it.
>
> ". . . The other day, mother and I were waiting for a train at a station in the city. Just then, an American plane was flying over us. At the sight of the plane a lovely small boy was very glad, but his young mother, who was a Korean, forbade him to look at it with an air of hatred in her face. So my mother asked her, 'Has any of your family members been killed by the atomic bombs?' 'Yes', she replied, 'my husband and a child were killed.' "

We also received, in addition, circulars and letters from organizations in Japan that were specifically formed to combat the evils of the bomb:

> ". . . we are the members of the society which was established by the university students soon after the seriousness of the *Fukuryu Maru* ‡5 case was brought home to us. Its aim is to bring forth the 'armless peace' by exchanging views, pictures of life and other information with all the peoples in the world by means of correspondents in their own language.
>
> "As we believe that it is the first step towards world peace to stop the H-Bomb tests and that we Japanese are in a position to speak for the world on this problem ahead of any other nation, we are concentrating our efforts in this direction for the time being. The pamphlet enclosed . . . [contains] the English translations of the declarations made by various organizations in our country which, being exhaustive in their selection, can be said to represent the way of thinking of all the Japanese about the recent tragic incident at Bikini. We have prepared some 200 copies of the same pamphlet and have already sent most of them to . . . people . . . in various parts of the world. . . ." (Society of International Cultural Intercourse — Osaka University of Foreign Studies, Osaka, Japan.)

In looking through the enclosed pamphlet, we find statements by four widely different groupings, selections of which follow:

> ". . . Such horrible effects of atomic and hydrogen bombs have definitely proved that the use of nuclear weapons leads to the extermination of mankind. We Japanese women are firmly determined that no more 'lethal ashes' shall fall upon the earth and our sufferings shall never be repeated in any country.
>
> "Without the prohibition of the production, experiment and use of nuclear weapons and the assurance by the Big Powers of the international control and peaceful utilization of atomic energy, any effort of ours for the survival of the human race will be in vain.
>
> "You as well as we must never be the fourth victims. We do hope, therefore, that you will lend ears to our cries to drive the 'lethal ashes' out of the earth." (The Association of Housewives in Japan, and The Women's Association.)

The Rally of Marketers for the Counter-Measure of the H-Bombs, held on 2nd April, 1954, issued the following declaration:

> "There has been an indissoluble connection between the life of the Japanese and fish in that they find it one of the major sources of nutrition.
>
> "In prewar days, Japan was one of the world's three biggest fishing countries, boasting of a big catch; but things have completely changed after the war and there has been an alarming decrease in the catch in recent years. There is every reason to believe that if there is no change for the better, it will not be long before the whole population of the country will be deprived of its fish supply.
>
> "The three best fishing grounds in the world are closed to the Japanese fisherman, with no peaceful agreements reached between nations. In addition most of the inshore fisheries are set apart for the use of the American garrison forces as well as the Japanese defense forces. It is but natural that the life of the fishing people has been driven to desperate conditions. . . .
>
> ". . . [Now] a series of recent hydrogen bomb experiments conducted by the United States have inflicted serious damage on us petty fish-dealers almost to the point of sealing the fate. Even the biggest fishmongers in Tokyo have had to close their stores. We were sadly mistaken when we thought a couple of days would see the end of the commotion. Two weeks have passed, but no trade regaining normalcy; there is even a strong indication that things are turning for the worse.
>
> "While we are in the dark as to how long we are to be in this state of affairs, the research by the experts brought home the extent and severity of the damage. We learned, to our horror, that there was another H-bomb test carried on without warning on March 26th. Further test will be made in the expanded warning area. The expansion of the off-limit area to about 445,000 square miles, six times as wide as before, has severely affected the people of Misaki, Shiogama and Yaizu, the three most important fishing ports in Japan, by giving a fatal blow to the pelagic fishery on which they depend for their livelihood. . . ."

Some of the listed demands of the "petty fish mongers" are: "The full compensation for the damage to be made by the United States Government, with the responsibility for its negotiations taken by the Japanese Government", and "The holding of a Big Powers conference, for a ban on the H-Bomb as well as the A-Bomb".

120,000 members of the Private Railway Workers Union resolved:

> ". . . we Japanese are firmly convinced that it is our noble duty as well as right to appeal to other peoples of the world for the immediate ban on the production of such terrible weapons as will lead to the extermination of mankind.
>
> "The unanimous resolution in the Japanese Diet asking the United Nations for its realization shows that this way of thinking has now become the conviction of all the Japanese people, based upon humanism and justice of basic human rights independent of politics and creeds. . . ."

The Railway Workers Union urges amongst other things "proper and satisfactory reparations from the United States Government . . . , immediate materialization of an International Agreement for absolute prohibition of holocaustic weapons such as atomic and hydrogen bombs" and "thorough-going peaceful talks by the Big Five, that are especially responsible for international politics, for the relaxation of the now-existing world tension. . . ."

The last organization covered in the pamphlet, the Freedom and Human Rights Protection Association, states:

> ". . . Firstly, we request that a proper measure should be immediately taken for the peaceful control of atomic energy and that the United States Government stop the tests for good that give such a fatal blow to Japanese fishing industry, threatening the existence of Japan as an oceanic country. Secondly, we earnestly desire that thorough investigations be made by the United Nations and other international organizations for prevention of such a tragedy in the future.
>
> "Finally, in view of the plain fact that the recent calamity has been a menace

> to the lives of victims and their rights to live, our association, deeply interested in the protection of human rights, hopes that both the United States and the Japanese Government will lose no time in taking appropriate measures for the victims from a humanitarian standpoint."

These four statements demonstrate clearly the misconceptions and illusions held by popular movements. Other movements, not very popular perhaps, are deliberate protagonists of these misconceptions and illusions. No alternative presents itself but to appeal to the United Nations and to Big Power Conferences to "relax the now-existing world tension". As already stated, such action leads only to frustration and disillusion. Their only positive effect can be measured by the public opinion they arouse. It has been demonstrated time and time again that public appeals, petitions and resolutions are usually buried in files. Means of bypassing these well-filled tombs and disseminating the information must be developed to ensure the success of the campaign. It bears repetition that Big Power Conferences are used to deceive people into believing that something will be done, that it is only a question of reaching an agreement about supervision, control, etc. Certainly there are people who feel that this method brings results. It may well be that millions of people will have thought this out for themselves. Still, it is the responsibility of all those who see the situation in proper perspective, to declare unambiguously: If the powers wish to meet and talk, let them do so. But first, before any meeting — the cessation of any atomic explosions of any type for any purpose. That must be the universal demand.

A statement similar in some respects to the ones quoted above was sent us from the Hiroshima Prefectural Liaison Headquarters for a Campaign Against Atomic and Hydrogen Bombs:

> "At the Convention of Hiroshima on the 15th of May, an appeal was made to the nations for the prohibition of nuclear weapons. Since then the movement has made a rapid advance among the survivors of the bomb as well as among those bereaved who still cherish the grief of the dear loss. A campaign of collecting subscriptions for the cause has also been enacted by diverse organizations representing women, P.T.A.'s, cultural circles, trade unions, religious groups and youths' associations, etc., throughout the prefecture.
>
> "To-day, on the ninth anniversary of the disaster, to this memorial site of the Explosion Center, gathered are more than thirty thousand people of Hiroshima — their political, religious or ideological differences surmounted and dismissed. In our earnest hope and prayer that the bombs be banished, we formulated the resolution which we now send you enclosed herein.
>
> "As of to-day, August 6th of 1954, among the entire populace of the prefecture, 898,037 individuals have signed their names under the cause against nuclear weapons. In order to obtain for this cause a full and total subscription by two million individuals who live in this prefecture, the convention determined to post the following as the slogans for its future activities:
>
> 1 — The informational campaign to bring the public to a better knowledge of reality and horror of the bomb's effect should be encouraged.
>
> 2 — The signature-collecting drive should be continued and further extended.
>
> 3 — A movement must be enforced to induce resolutions by each local and municipal assembly asking the National Government for assistance in medication, physical and spiritual subsistence for the surviving A-Bomb casualties.
>
> ". . . We, in the name of those who are here at this convention, hereby resolved as below and thus request the United Nations and nations concerned to take immediate actions in realization thereof:
>
> 1 — That experimentations as well as manufacturing or any application of nuclear weapons should be prohibited.
>
> 2 — That an international conference should immediately be called for the control of atomic energy and for the prohibition of nuclear weapons."

Mr. Ichiro Moritaki, Executive Director of the above organization later ollowed this statement with his thanks to us,

> ". . . for your cable encouraging our Convention held on August 6 and your kind letter of August 20 addressed to our chief representative, Mrs. Shigeko Hata enclosing a leaflet *Stop the Bomb*. . . . We are now circulating your leaflet . . . by every chance. . . .
>
> "Since the Convention our campaign has remarkably extended, and the signatures against A- and H-Bombs canvassed in our Hiroshima Prefecture amounted to more than one million by August 20th and on August 27th when we sent off the signature books to the Headquarters of the United Nations the number of signatures amounted to 1,013,472 which surpasses a half of the total population of the Hiroshima Prefecture. . . .
>
> "I earnestly ask you to be so good to watch the effect of our signature books upon the activity of the members of General Assembly of U.N. which is to be opened on September 21."

We shall naturally watch to see the effect of these signatures, bound in eighty-four volumes weighing 125 kilograms on the worthies at the United Nations, but we fear that they will be stored for "safe keeping" and buried under a mountain of other ignored petitions and signatures. Should they appear, their influence on the delegates and their decisions will have to be observed. Considering that the death of the Japanese fisherman, Kuboyama, dusted by ashes from the Hydrogen bomb explosion, has been so quickly dismissed as an unfortunate accident it is questionable whether signatures can have more effect.

Additional statements and letters to those already presented here are still coming in from different parts of the United States and Japan. But, f this summary is ever to appear, an arbitrary break must be made somewhere. However, before doing so, one more point — the problem of how to proceed in furthering the campaign.

In the United States the protest, in all probability, will not reach the intensity it has and will yet achieve in Japan. Nonetheless, an enlightened, outraged public can exert decisive pressure on the government to cease these experiments. As an indication of such a reaction as well as an instrument adding to the enlightenment of the subject, it is worth reporting that one of our readers has proposed that the radiation count be included in the daily weather forecast. (When checked by phone, the weather bureau declared that they did compile such a count but that it was "classified" information.) The value of this proposal is immediately apparent in that it allows everyone to assess for themselves the difference between the present background radiation count and the normal count. Here too, we see, means are being sought to combat the bomb.

The statements and letters quoted above are only a pale reflection of the situation and sentiment in Japan. In discussing the "next step" for that country, one of our collaborators offered the following suggestion to our Japanese friends:

> ". . . Concerning the campaign, I think it is clear that, because of their unique experience, the Japanese people must play a very special role. We get the distinct impression that 80,000,000 people in Japan are bitterly angry, and desire only to do something about it. On the other hand, most people outside of Japan are not completely awake to the dangers involved in nuclear explosions. The necessity of the Japanese experiences being brought vividly to their attention therefore assumes great urgency. For it is only the outside world — especially the American people — who can definitely put an end to the explosions.

> "This is the only way the Japanese can help save themselves: they must brea the wall of silence which has been erected around them by the American pres and government (whose influence is strongly felt in many other countries) an the campaign of false opposition to the bomb being waged by the Communist When this is done, they will undoubtedly meet many friends and helpers o whom neither they nor we now know. Then, a truly international movement o overwhelming proportions may develop.
>
> "The first thing to be done, we believe, is to unify the Japanese anti-bom movement, so that it can speak effectively with the thunder and elemental forc of many voices. Many organizations in Japan are on record as opposing th bomb. People not yet adequately represented by these organizations should for themselves into local anti-bomb committees. Every phase of social existence i your country should have its anti-bomb association — every community, ever school, every profession.
>
> "These committees, groups, etc., should draw themselves together in clos co-operation by every possible connecting link — group publications, publi discussions, regional congresses, and correspondence with every source of ai and co-operation abroad. They should attempt to form themselves into national federation in which the various groups would meet, discuss their problems and alternatives for action, and agree on a co-ordinated program. Such federation should organize itself on a basis of complete mutuality amongst th participating groups. The authority of the federation to speak for the natio will arise from its being, collectively, the voice of the entire nation. The objective and slogan of individuals, local committees, and national federation woul be the same: STOP THE BOMB."

With this last letter, the summary ends, ironically enough, at the ver inception point of the campaign. We hope to present further development and material as time goes on. In the interim, we urge our readers, a individuals and as members of organizations, to join with us in the struggl against further thermonuclear explosions.

November 20th, 1954.

H. D. Kirk

THE RESPONSIBILITY OF FREE MEN

(A Sermon given at the University Church, Cortland, New York, o 16th May, 1954.)

THE subject of to-day is freedom and responsibility. It may seem odd t you that anyone should want to add yet another one to the many curren pronouncements on freedom. Daily we are the recipients, through all th mass-media of communication, of summons to the ramparts of freedom free enterprise and free speech, free press and free politics, free classroom and free pulpits. Paramount among all of these is the call to defend th free world against the onslaughts of totalitarian régimes. Now all thes causes are well worth thinking about and acting upon, but in calmness o spirit and with readiness to weigh them against alternatives. Instead w are at present engaged in using the term "freedom" as a slogan while th liberties of persons and of groups are being increasingly circumscribed b the insidious forces of fear and suspicion. The reason for discussing libert and responsibility here this morning derives from the need to shift th emphasis from slogan to inquiry, from propaganda to reason, from expediency to conscience.

Most of us have grown up with the Jeffersonian notion that the price of liberty is eternal vigilance. This statement is part and parcel of our folklore. We repeat it without much thought: we pass it on to our children, and annually, at hundreds of graduation exercises throughout the length and breadth of this land the young are solemnly reminded that this vigilance is their privilege and indeed their duty. But if we are diligent in stating and restating this idea, we are perhaps less readily inclined to determine its meaning. What is this liberty which merits such unending care? And by what means shall it be guarded?

The first question has been answered in part, but only in part, by the men who wrote the Bill of Rights, by those who fought for certain amendments to the Constitution, and by all those others who, whether successful or not, struggled for the increase in a life of dignity and security for the people of this country. I am reminded here of the name of that great American labor leader, Eugene V. Debs, who so identified himself with the suffering of others that he could say that as long as one man was cold and hungry he also would be in want, and as long as there remained but one man in prison he himself could not be free. I am also thinking of the pioneers of the Women's Rights movement, of those who paved the way for the emancipation of slaves, and all who have labored for the coming of an international order though it has not yet come into being. But all these past and present workers in the cause of liberty in the sense of human rights make up only part of those who have laid claim to the definition of that term. There have been and there remain others who have interpreted and defined "liberty" to please their own special purposes: freedom to do business without restrictions of any kind, freedom to exploit the natural resources of the country without regard for the needs of others or of the results even for themselves and their heirs, freedom to stake a *special* claim to the enjoyment of citizenship, the goods, and the participation in the communal life on the basis of ancestry.

And what about the means, the ways of guarding liberty? "Eternal vigilance" we say to ourselves. Vigilance presupposes that we are looking and watching. But in what direction? Here again we note a two-fold approach. By and large we have looked toward outward enemies as encroaching upon our freedoms: kings and popes, empires and foreign commitments, and lately alien doctrines. But from time to time we have also suspected that the enemy was in our midst and have frantically tried to rout him out with such weapons as the Alien and Sedition Acts, the Know-Nothing Party, the Ku Klux Klan, and the Smith Act. As long as we watched and guarded largely against outward enemies we were thereby at least likely to close ranks among ourselves and to create a nation of some common purpose. During those times, however, when like to-day we have looked under every bed and have come to suspect every skeptical and libertarian word as possibly connoting treason, our watchfulness has led to a house divided against itself and to a dwindling, rather than a growth, of any liberty which has been the purported end of our watchfulness.

I would like to remind you to-day of yet another kind of vigilance, not so much as a substitute for the first or the second but as a means in its own right for guarding freedom. This method is not of my invention; I am merely recalling it and trying to see how it might fit our present needs. It is vigilance of an *inward* kind, a vigilance which strains to see whether our activities as a people are in line with our professions and our creed of the freedom of man. We will remember that Rabbi Joshua of Nazareth called on us to inspect the beam in our own eye before making a search for the mote in our brother's. But there is a spell cast over literature which is regarded as sacred and it is therefore seldom possible to make it fully apply to the needs of a secular world. So it happens that from generation to generation new prophets must arise to remind us of this inward vigilance and steer us toward the course of its liberating power. In ages which are alive with religious fervor these prophets are more likely than not to appear in religious garb and to speak the language of religion, but when religion has become perfunctory and a mere adjunct to secular pursuits, the prophets will be secular ones. Thus it happened that over a hundred years ago the Negro abolitionist leader Frederick Douglass, in his 4th of July oration at Rochester, N.Y., could protest:

> "What to the American slave is your Fourth of July? I answer: a day that reveals to him, more than all other days in the year, the gross injustice and cruelty to which he is the constant victim. To him your celebration is a sham; your boasted liberty an unholy license; your national greatness, swelling vanity; your sounds of rejoycing are empty and heartless; your denunciation of tyrants, brassfronted impudence; your shouts of liberty and equality, hollow mockery; your prayers and hymns, your sermons and thanksgivings, with all your religious parade and solemnity, are, to him, more bombast, fraud, deception, impiety and hypocrisy — a thin veil to cover up crimes which would disgrace a nation of savages."*

While the 1850's already were this-worldly, they were also the days of powerful forensic, days in which this looking inward could be speeded by moving verbal appeals. But the world in which *we* live has become full of words and appeals of all kinds, full of skilful manipulations of every man's heart and mind by subtle practitioners of persuasion, those who need not be persuaded themselves of the rightness of what they are selling. It has become an occupation, and strangely, an honored one, to engage in advertising wares and ideas to the point of hammering at the people with slogans until their brains are so washed and conditioned that they cannot withstand the product any longer. And what is more, they are frequently even led to think that the choice has actually been their own. For *us* oratory is therefore less and less useful in drawing us toward this inward watch, this vigilance on behalf of our freedoms. How then are *we* to accomplish it? Unfortunately I cannot give you any formula for doing so, though fortunately I am in possession of the knowledge of an event which may possibly help us, together, in discovering our own course.

The event to which reference is being made occurred during the Second World War. The Japanese had attacked Pearl Harbor. The traditional anti-Oriental agitation of certain West Coast forces and interests now came to be directed primarily against the Japanese minority there. As a result of this agitation, and not because of any fancied sabotage danger stemming from them, 111,000 Japanese residents were driven from their homes and sent into desert camps. Of these persons nearly 73,000 were citizens by

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*Quoted from W. E. B. Du Bois, *Black Reconstruction* (1935), p. 14.

birth, while most of the first-generation immigrants from Japan had been unable to obtain naturalization owing to legislation which barred them from it. For the first time in American history were citizens of this country deprived of their rights as citizens in a wholesale fashion and without due process of law.

The life in these camps was no picnic. The Japanese had always had hard sledding but in California and other West Coast states many families had, through hard, intensive work, been able to acquire property and some semblance of security. Most of this was swept away in the panic which sent them to the camps. In these places, denuded of the familiar objects which make life livable to many of us, without their old neighbors and acquaintances, herded together in barracks, with minimum privacy and no chance to live a complete and satisfactory family life, with food dished out at large messhalls rather than within the circle of the family, life tended to become a very brittle thing.

Let us try to put ourselves in their shoes for a moment. Let us assume that we, the people of Cortland, had just been told to sort out all the people with dark hair and send them to some kind of concentration camp in Pennsylvania, on the insane assumption that dark-haired people are especially injurious to the successful pursuit of the forthcoming elections. Let us assume that dark-hairedness runs in families so that they stay together, but that except for this bond we the people of Cortland are to be divided up and some of us shipped out. We are asked to make all necessary arrangements within a few hours, asked to settle our businesses by next Friday, store our furniture, meet our debts, sell or rent our land and other real estate, call in our loans, and are meanwhile told not to feel like heels and traitors since this move is supposed to be in the interest of the whole community. And then we are assembled in a bleak place, an old abandoned mining town perhaps, bereft of much of our personal gear except what came along with us in a suitcase or two, and thrown together with hundreds of other people who are supposed to be just like us because they too have dark hair. We know we are being pushed around and we will feel ourselves deprived of the most fundamental rights of citizenship. I will venture to say that we would feel bewildered and troubled and that, if the condition of isolation and camp-incarceration continued for any length of time, many of us would become cynical, hostile, and destructive.

Well, camp life continued for these people for many, many months without any apparent end, and indeed their condition worsened when the camps were surrounded by wire fences, and guarded by soldiers. This meant insult in addition to injury. There was trouble in several camps. At Manzanar there was a strike and at Poston, in Arizona, a riot. Even so, the vast majority of the internees somehow continued to try to live and keep their faith in America. Eventually the War Relocation Authority which was entrusted with the evacuation and maintenance of the Japanese minority, tried to get a system of voluntary enlistment of young citizen internees for the armed forces. Being well-meaning persons, the administrators reasoned that this would make the country realize how unjustly these people had been treated, believing that fear and hate of the scape goat would give way before the admiration of valor and patriotism. But the army had learned a lesson: here were people in camps, they had been branded as outcasts. Where there's smoke, there's fire, and all that. So the armed forces would have to be sure that the people who volunteered were really loyal Americans. In this way there came to be an overall investigation of every person over seventeen years of age. Male citizens were asked, among other things:

—Are you willing to serve in the armed forces of the United States on combat duty, wherever ordered?

—Will you swear *unqualified* allegiance to the United States of America and faithfully defend the United States from any and all attack, by foreign and domestic forces, and forswear any form of allegiance or obedience to the Japanese Emperor, or any other foreign government, power, or organization? (Emphasis added.)

Female citizens and aliens of both sexes were asked whether they would be willing to serve in noncombatant capacities and also whether they forswore any allegiance to the Emperor and government of Japan. For the aliens this was rather fantastic because they had been denied full participation in American life and were now expected to pull up what anchor remained for them in a feeling connected with Japan. Nevertheless, almost to a man and woman they obliged. But among the citizens there remained a relatively small minority who refused to swear the unqualified allegiance which had been asked of them. These people came to be threatened with a special punitive camp from which, after the war they would be sent to Japan, bereft of American citizenship. The government understood, however, that many of these people were under severe pressures, so that they might be saying things they did not really mean, and it was therefore decided to screen them before a hearing board.

Several years ago I had the opportunity of studying some five hundred individual reports of these hearings from one camp. I had wondered whether people who were very much Americanized would differ from those who were perhaps less influenced by our own values in the reasons they gave for refusing to swear unqualified loyalty. You see, the common assumption had been that the people who refused to so swear unqualified loyalty were disloyal. But some people were not so sure and I thought maybe these records would give a clue to that question. The investigators asked each person who had refused to swear unqualified loyalty his reason for the refusal. I classified the persons interviewed into those who were recorded as having been to Japan and those who had never been abroad, assuming that those who had had some experience or even education in Japan would be likely to be less influenced by an American system of ideas and values than those who had never left American soil. Then I classified for each of these the reasons they gave for holding on to their refusal to swear unqualified allegiance. The crude classifications of reasons were: "Protest", "Family", "Pro-Japan", and "miscellaneous".

Under "Protest" reasons I filed all such explanations as for instance: unwillingness to swear unqualified loyalty to a country that had taken one's citizenship rights away, that had discriminated against one on the basis of race, had caused one to lose property, and I also included such statements as indicated that the interviewed were "generally sore" at the evacuation. "Family" reasons meant that the person might want to protect an old parent, or go to Japan with a fiancé(e) or spouse who were asking r repatriation or was refusing this oath also. Now you may be interested the fact that of the group which had been outside of the United States nd of the one which had never left the soil of this country, an almost dentical proportion, namely forty-two per cent, declared that they could ot swear unqualified loyalty because of some family reason. The family as, you see, a powerful matter for them. When it came to protest, however, things were very different. Of the people who had been to Japan, ewer than five per cent used their refusal of the unqualified oath for urposes of protest against the treatment they had received at the hands of he government. Now note the strange thing: of the people who had never een out of the United States thirty per cent were protesting. Thirty per ent of the fully Americanized as against five per cent of those who were erhaps less Americanized. Does that indicate that the refusal to swear nqualified loyalty under such circumstances was disloyal? I wonder. Don't ou wonder too? Couldn't it be that part of our heritage is to kick and bject and be sore when our freedoms, which are guaranteed to us, aren't urs in reality?

Well, I spoke of this here to-day because I wanted to suggest where we might find some of this looking inward in our day, some of the evaluation of our own creed in the light of our own actions. I wanted to suggest that when we can't tell too clearly anymore what among the speeches is propaganda, and when we are not even able to wind our way around the flood of words and appeals that is constantly engulfing us, we may want to look lsewhere for ways of guarding our liberty through this evaluating and looking inward. We may want to look to the *active* protests which people undertake, as indicators of what may be wrong with our freedoms. You will remember that since the late 1940's we have had an ever increasing number of prison riots. It has been suggested by an eminent authority on prisons that these riots occur not because of bad food, or overcrowding, or brutal treatment, all of which may in fact be real enough, but underlying all these, because men just cannot stand prison life and because our whole way of dealing with offenders is destructive of the development of human beings and productive of beasts. In the nineteenth century there was much talking and agitation against vile prisons. We have become inured to the agitation. Now we must look to the riots. This looks simple enough, doesn't it? Well, in the case of prisons and the inhumanity we perpetrate on juvenile and adult offenders in them it may now be simple to apply the indicator of "riots" to become aware of the lack of freedom for men, to turn the gaze inward upon ourselves and our society in that instance. It appears simple only because we now have the thing we believe is the right indicator for one kind of lack of freedom. But in each instance we would have to become aware and vigilant in a different way.

There is the matter of our government's testing of H-bombs in the Marshall Islands of the Pacific. A boatload of Japanese fishermen, eighty miles away from the scene get burned. A shipload of fish is spoiled and has become poisonous. The Japanese people and government are frightened. In Japan there are protests against continued tests of thermo-nuclear weapons, in Great Britain and India there are similar strong protests. Now finally the people of the Marshall Islands have sent an appeal to the United Nations to see that the tests are stopped or precautions are taken to safeguard the lives, the homes, and the property of the people there. How wil we decide whether these events are indicators for us in our evaluating the state of our own freedom? Here we have no secure landmark, the signs are blurred, and the voices of counsel as confusing as those in the Tower o Babel. But perhaps we can recall now what was said before: The reason for discussing liberty and responsibility here this morning was to shift the emphasis from slogan to inquiry, from propaganda to reason, and from expediency to conscience. We have dealt with all these except one: conscience. There are a variety of ways to explain the phenomenon o conscience: one, that it is God-given; two, that it exists full-blown and needs only to be "developed"; three, that it needs to be planted and nourished, and tended. Together with most social scientists and probably with most of you who have raised children, I believe that conscience is no there in the beginning but that it is implanted in the self of the growing person and that what is implanted are the values of the society in which we live. This is a pretty crude and partial way of putting it and I mus leave it there for the sake of brevity. But we can ask ourselves how we might know whether the events just described, the injury to the fishermen the protests from abroad, have any relevance for our own freedom? Wha do our consciences tell us? Is it possible that our fears are enslaving us long before an enemy from outside has begun to do so? Do our consciences tell us that the lack of protest in our own country indicates a diminishing freedom for our very consciences? Can these things mean that consciences have to be exercised to operate properly, and that, if unused, they may wither away? What do these things mean, what do they hold for us? I do not pretend to know with certainty. All we can do is to remind ourselves of the fact that what freedoms men may actually possess must be guarded by awareness, guarded by willingness to evaluate the corporate actions in the light of the corporate values and creed.

John Donne long ago said: "No man is an island unto himself" to which we might well add, nor is any nation or any group. And, since we have been concerned to-day with freedom we may want to bring our reason and our conscience to bear on our responsibility to the welfare of men in other places, and far away, sensing that we cannot be even a little free at the expense of their health, their fortune, and their happiness.

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